HOUGH'S AMERICAN WOODS.

PART V.

THE

AMERICAN WOODS,

EXHIBITED BY ACTUAL SPECIMENS

AND WITH COPIOUS EXPLANATORY TEXT,

BY

ROMEYN B. HOUGH, B. A.

PART V.

REPRESENTING TWENTY-FIVE SPECIES

BY

TWENTY-FIVE SETS OF SECTIONS.

LOWVILLE, N. Y., U. S. A.
PUBLISHED AND SECTIONS PREPARED BY THE AUTHOR
1894.

WEED-PARSONS PRINTING CO.,
ELECTROTYPERS AND PRINTERS,
ALBANY, N. Y.

TO MY VENERABLE FRIENDS

Dr. A. W. Chapman,

AUTHOR OF

FLORA OF THE SOUTHERN STATES,

AND

Dr. Charles Mohr,

DEVOTEES TO NATURE, IN THE FIELDS WHERE THE SPECIES OF PART V

AMERICAN WOODS

ARE FOUND, IT IS

RESPECTFULLY DEDICATED.

PREFACE TO THE SERIES.

The necessity of more generally diffused information concerning the variety and importance of our forest trees is justification enough for the appearance of this work, especially at this day, when the demands of Forestry in this country are constantly more and more keenly felt. The work was undertaken at the suggestion of my father, whose intense interest in Forestry, and a kindred taste, at once gave me inspiration to the work. It was entered upon with the expectation of his valuable companionship and counsel during its progress, but, alas ! that I was destined to have only at the outset, and, while I was then left ever to mourn the loss of a kind father, companion and teacher, the reader must fail to find in these pages that value and finish which his mind would have given them.

Among the happiest pictures of my memory are those in which I see my father's delight, as I would show to him, from time to time, my successful progress in devising a way of making the sections for this work, and if only for the happiness which its appearance would have caused him, could he have lived until this day, I have felt duty-bound to go on with it, even though left to do it alone.

The work is the outgrowth of one, of somewhat similar plan, proposed by my father some years since, but which he did not carry into effect. Its design is primarily and principally to show, in as compact and perfect a manner as possible, authentic specimens of our American woods, both native and introduced. For that end three sections, respectively transverse, radial and tangential to the grain (see Glossary), are made of each timber, sufficiently thin to allow in a measure the transmission of light, and securely mounted in well made frames.

The three planes above mentioned show the grain from all sides, so to speak, no plane being possible but that would be either one of them or a combination of them. The difficulty, however, of cutting a great number of sections exactly on those planes is obvious, so let it be understood that the terms, "transverse," "radial" and "tangential," are, in many cases, only approximately exact in their application.

My endeavor is to show, either in a part or all of the sections standing to represent a species, both the heart and sap-wood, but with some woods

as the Sumach, for instance, where usually only the outermost ring, or a part of it, could be said to represent the sap-wood, the display of that is quite impossible. In certain other woods, as the Spruce, etc., the transition from sap to heart-wood is almost indistinguishable by any difference in color, and, although both may be shown in the sections, one can scarcely distinguish between them.

The sequence of the numbers given to the various species is of importance only to show the botanical arrangement within a given Part, each Part being independent of the others.

The text of this work has been added rather as a secondary matter, to supply to those not having it in other form, such information as is of importance, in connection with the wood specimens, to give a fairly good acquaintance with the trees represented. It contains little, if any thing, new to the botanist, but to others it is hoped it may be of some value.

In its preparation some use has been made of my father's Elements of Forestry, and thanks are due the publishers of that work — Messrs. Robert Clarke & Co. of Cincinnati, Ohio — for the use of cuts in reproducing a number of its illustrations. Other valuable books of reference have been the works of Drs. Gray, Wood and Bessey, LeMaout and Decaisne's Descriptive and Analytical Botany, Prof. C. S. Sargent's Report on the Forest Trees of North America (constituting Vol. IX, Tenth Census of the United States, 1880), Micheaux and Nuttall's North American Sylva, George B. Emerson's Trees and Shrubs of Massachusetts, D. J. Browne's Trees of America, etc.

The authenticity of the timbers represented in this work has been a subject of personal attention and special care on the part of the author. The trees selected for specimens have been identified in the field, before felling, while the leaves, flowers or fruit (one or more) have been obtainable, and he can, hence, vouch for the authenticity of every specimen represented.

Succeeding Parts, uniform in style with Part I, and representing in each case twenty-five additional species, are planned to appear later, with the ultimate end in view of representing, as nearly as possible, all of the American woods, or at least the most important, in such a series of volumes as this one.

Upon the reception which this meets in public favor, and upon the co-operation of those interested in the cause, must naturally depend the carrying out of that plan. It is hoped that greater experience and skill will enable us to obviate in future parts the faults which occur, from lack of those qualities, in this.

Notice of errors in this work will be thankfully received in hopes of profiting therefrom in the future.

LOWVILLE, N. Y., *March* 30, 1888.

PREFACE TO PART V

The specimens represented in Part V, AMERICAN WOODS, were collected in Florida, and prepared previously to those of Part IV, but it was deemed best to hold them until Part IV had been issued, as the species represented in that, as in the earlier parts, are distinctively woods of New York and the adjacent States. Like Part IV, it has suffered the interruption occasioned by the author's duties as Superintendent of the Department of Forestry of the State of New York at the Columbian Exposition, as detailed in the preface to Part IV, and the specimen portions of the first copies of Part V have, likewise, been sent out in advance of the text.

I am pleased now to be able to send out the belated text, trusting that I shall not again in the progress of AMERICAN WOODS have occasion to issue the two portions of any part separately.

As for the nomenclature adopted in this part, I have only to say, as heretofore explained, that the importance of conformity with the manuals of botany in common use, and with the early parts of AMERICAN WOODS, does not allow me to make all of the changes recently advocated by systematists, but such names as have a greater or less claim upon common usage, have been mentioned as foot notes.

In the preparation of Part V, I gratefully acknowledge the assistance rendered by Dr. Chas. Mohr and Mrs. E. G. Britton in determining the synonyms in foreign languages. For aid in the field I am under obligation to Mr. A. H. Curtis, whose familiarity with the flora of Florida is well known, and who generously rendered important service.

One event and obligation connected with the field work, which I remember with greatest pleasure and which I wish especially to mention, was the cordial reception and assistance rendered by the venerable author of "Flora of the Southern States," Dr. A. W. Chapman. At his distant home in Apalachicola, Fla., far remote from others of kindred tastes, I found him, at the age of eighty-two, wonderfully well preserved and surrounded with his books and specimens, as enthusiastic and energetic as in the prime of life. It was an inspiration to visit with him, and I acknowledge with gratitude the service he then and has since cheerfully rendered.

We hope our patrons will be pleased with Part V and thank them cordially for their continued favors.

LOWVILLE, N. Y., *Dec.* 31, 1894.

A KEY, BASED MAINLY UPON THE FLOWERS,

Designed as an Aid in the Identification of the Species represented in Parts I, II, III, IV and V.

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a. **Angiospermæ** — seeds in a closed ovary.
b. *Polypetalous* — petals present and distinct.
c. Stamens numerous, more than 10, and
d. Calyx inferior — wholly free from the pistil or pistils.
e. Pistils numerous and cohering in a cone-like mass. (*Magnoliaciæ*).
f. Anthers opening inward; leaves folded lengthwise in the bud (*Magnolia*), pointed at both ends and
g. Thick
Glaucous beneath .. .. 51. M. GLAUCA.
Rusty tomentose beneath .....101. M. GRANDIFLORA.
*g*². Thin, green beneath.....1. M. ACUMINATA.
*f*². Anthers opening outward and leaves folded crosswise in the bud.
2. LIRIODENDRON TULIPIFERA.
*e*². Pistils more than one, separate (or nearly so) stamens inserted on receptacle and filaments shorter than anthers (*Anonaceæ*).
76. ASIMINA TRILOBA.
*e*³. Pistil solitary and
f. One celled, style single, flowers perfect, stone of drupe bony (*Prunus*) and
g. Compressed, with ridged margin; calyx-lobes glandular serrate.
81. P. NIGRA.
*g*². Marginless; flowers in
h. Racemes terminal..... ....29. P. SEROTINA.
*h*². Corembose umbels.....55. P. PENNSYLVANICUM.
*h*³. Umbels; leaves
Acuminate, hairy beneath..... ...56. P. AVIUM.
Acute, nearly smooth beneath . .....82. P. CERASUS.
*f*². Compound as shown by the styles and cells of ovary; leaves.
g. Punctate with pelucid dots (*Aurantiaceæ*); stamens about
20; fruit globose, flattened at ends. . 103. CITRUS AURANTIUM.
35; fruit globose-oblong, pointed .....104. CITRUS LIMONUM.
*g*². Not punctate.
h. Simple and calyx.
Valvate in the bud, deciduous (*Tiliaceæ*) stamens polydelphous (*Tilia*) and with 5 petal-like scales opposite the petals.
3. TILIA AMERICANA.

Imbricated in the bud, persistent; stamens at the base of petals (*Temstrœmiaceæ*); calyx simple; stamens 5-adelphous (*Gordonia*); leaves coriaceous, evergreen....102. G. LASIANTHUS.

*h*². Compound (*Meliaceæ*).....105. MELIA AZEDARACH.

*d*². Calyx superior — adnate — to the ovary or at least its lower half; ovules.

e. More than one in each cell; ovary

f. 2-5-celled; fruit a.

g. Pome with 2-5 papery carpels (*Pyrus*); leaves

h. Simple and styles

i. United below; leaves

Serrate (not lobed), downy.....30. P. MALUS.

Incisely serrate and sublobate, smooth.....83. P. CORONARIA.

*i*². Distinct.....57. P. COMMUNIS.

*h*². Pinnately compound.....84. P. SAMBUCIFOLIA.

*g*². Pome drupe-like with 1-5 bony seeds (*Crataegus*); leaves

h. Villous, cuniform, obovate.....58. C. PUNCTATA.

*h*². Glabrous, abrupt at base.....86. C. COCCINEA.

attenuate at base.....85. C. CRUS-GALLI.

*f*². Ovary 10-celled.....59. AMELANCHIER CANADENSIS.

*e*². Only one in each cell; stamens 4; styles and stigmas 1 (*Cornaceæ*); cymes

Subtended by a 4-leaved involucre.....88. CORNUS FLORIDA.

Naked, leaves alternate.....87. CORNUS ALTERNIFOLIA.

*c*². Stamens few, opposite the petals and of the same number; pistil one, with 2-4-celled ovary; calyx lobes obsolete; petals valvate (*Vitaceæ*).

78. VITIS ÆSTIVALIS.

*c*³. Stamens few, not more than 10, alternate with the petals when of the same number.

d. Calyx inferior — free from the ovary.

e. Ovaries 2-5, separate; styles

Terminal and conniving.....106. XANTHOXYLUM CLAVA-HERCULIS.

Lateral and distinct.....4. AILANTHUS GLANDULOSUS.

*e*². Ovary single, but compound as shown by the cells, styles or stigmas.

f. One-celled and one-seeded; styles or stigmas three; shrubs or trees with regular flowers (*Anacardiaceæ*); leaves compound with 11-31 oblong-lanceolate acuminate leaflets; common petiole densely villous and not winged; flowers in terminal thyrses.....5 RHUS TYPHINA.

*f*². Two to several-celled and flowers

g. Irregular (*Aesculus*).....6. AE. HIPPOCASTANUM.

*g*². Regular, stamens as many as the petals; trees with leaves.

h. 3-foliate.....77. PTELEA TRIFOLIATA.

*h*². Simple, persistent or subpersistent.

Stamens 5.....107. CYRILLA RACEMIFLORA.

Stamens 4; fruit berry-like.....ILEX OPACA; 52.

Stamens 10; leaves simple, evergreen.

108. CLIFTONIA LIGUSTRINA.

*e*³. Ovary single and simple, with one parital placenta (*Leguminosæ*); corolla

f. Papilionaceous; stamens distinct.....80. ROBINIA PSEUDACACIA.

*f*². Subregular and imbricated in aestivation.

g. Flowers dicœcious; stamens 10; tree unarmed.

27. GYMNOCLADUS CANADENSIS.

***g*²**. Flowers polygamous; stamens 5; tree armed with thorns usually triple (*Gleditschia*) pods.

Linear, many-seeded..... ....28. GLEDITSCHIA TRIACANTHOS.

Obliquely ovate, 1-seeded.....109. GLEDITSCHIA MONOSPERMA.

***d*²**. Calyx superior — adnate to the ovary; flowers in umbels; stamens 5; styles 5; fruit drupe-like with 5 cells each with a single ovule (*Aralia*); arborescent and armed with prickles.. ... .8. ARALIA SPINOSA.

***b*²**. *Gamopetalous* — petals present and united; stamens

c. Fewer than the lobes of the corolla and inserted on it.

112. OSMANTHUS AMERICANUS.

***c*²**. As many as the lobes of the corolla and alternate with them or fewer; ovary superior; corolla irregular; ovary 2-celled (*Bignoniaceæ*) pod terete; leaves simple (*Catalpa*)... .....89. C. BIGNONIODES.

***c*³**. 2–4-times as many as the lobes of the corolla, inserted on its base and filaments distinct (*Ebenaceæ*).....61. DIOSPYROS VIRGINIANA.

***b*³**. *Apetalous* — without petals.

c. Flowers not in catkins; pistil one, simple or compound, and the cells of the ovary containing 1–2 seeds each.

d. Ovary inferior — adnate its whole length to the calyx-tube — 1-celled and 1-seeded; style 1, stigmatic down the side (*Nyssa*); fertile peduncles

2–5-flowered..... ... .9. NYSSA MULTIFLORA.

Single flowered and peduncle short and downy .110. NYSSA OGECHE.

Two or more flowers.... ....9. N. MULTIFLORA.

***d*²**. Ovary superior — free from the calyx.

e. Stipules sheathing the stem; trees with naked monœcious flowers arranged in heads..... .....13. PLATANUS OCCIDENTALIS.

***e*²**. Stipules not sheathing the stem or none.

f. Ovules a pair in each cell of the ovary which becomes in

g. Fruit a double samara (*Acer*).

h. Leaves simple and palmately veined; flowers appearing

i. With the leaves in pendulous corymbs.....7. A. SACCHARINUM.

***i*²**. Before the leaves in short umbels, and

Apetalous; young fruit wooly.....26. A. DASYCARPUM.

Petals present, linear-oblong; fruit smooth..53. A. RUBRUM.

***i*³**. After the leaves, in drooping racemes

79. A. PENNSYLVANICUM.

***h*²**. Leaves compound..... ....54. A. NEGUNDO.

***g*²**. Fruit a 1-celled and 1-seeded samara (*Fraxinus*).

h. Samara terete at base; leaflets petiolulate

New growth smooth.....10. F. AMERICANA.

New growth pubsecent .....31. F. PUBESCENS.

***h*²**. Samara broad at base.....62. F. SAMBUCIFOLIA.

***f*²**. Ovules single in each of the 1 or 2 cells of the ovary.

g. Anthers opening by uplifted valves; stigma single and entire (*Lauraceæ*) flowers

Perfect; calyx persistent; leaves evergreen (*Persea*).

113. P. CAROLINENSIS.

Dicœcious, calyx deciduous, leaves deciduous; involucre none (*Sassafras*).. .....32. S. OFFICINALE.

***g*²**. Anthers extrorse; stigma 2-cleft; fruit a

h. Samara, 1-celled and winged all round (*Ulmus*).

i. Flowers nearly sessile; samara not ciliate-fringed; leaves very rough above .....11. U. FULVA.

i^2. Flowers on drooping pedicels; samara ciliate-fringed; leaves smooth.

Bud-scales glabrous; flowers fascicled; branches not corky-winged. .....33. U. AMERICANA.

Bud-scales downy-ciliate; flowers racemed; branches corky-winged..... .... 34. U. RACEMOSA.

h^2. Capsule, dry, nut-like, not winged (*Planera*).

114. P. AQUATICA.

g^3. Anthers introrse; fruit a dark-purple drupe; leaves long-taper-pointed..... ....12. CELTIS OCCIDENTALIS.

g^4. Anthers laterally dehiscent, fruit a drupe.

111. FORESTIERA ACUMINATA.

c^2. Flowers diclinous and one or both sorts in catkins.

d. Only one sort (the staminate flowers) in catkins.

e. Fertile flowers single or clustered; fruit naked; leaves pinnately compound (*Juglandaceæ*).

f. Corolla present in the fertile flowers; fruit with valveless epicarp (*Juglans*).

g. Fruit ovate, oblong and viscid-hairy.....14. J. CINEREA.

g^2. Fruit globose, roughly dotted (not viscid-hairy).....35. J. NIGRA.

f^2. Corolla not present in the fertile flower; fruit with usually 4-valved epicarp (*Carya*) which is

g. Thick; valves separating to base; bark

h. In loose plates, leaflets

5, smoothish; nut small ....36. C. ALBA.

7-9; nut large..... .. ..64. C. SULCATA.

h^2. Close, leaflets 7-9, tomentose.....90. C. TOMENTOSA.

g^2. Thin; bark close; nut

h. Quite smooth, small, thin-shelled, leaflets

5-7; kernel edible ....91. C. MICROCARPA.

7-9; kernel very bitter.....37. C. AMARA.

h^2. More ridged, larger, thicker-shelled; leaflets 5-9.

65. C. PORCINA.

h^3. Rugose, angular; leaflets 11-13 .....115. C. AQUATICA.

e^2. Fertile flowers 1-3 together, invested wholly or partly with an involucral covering; leaves simple (*Cupuliferæ*).

f. Involucre valveless, cup-like, composed of many scales and only partly inclosing the one nut, *i. e.*, acorn (*Quercus*).

g. Leaves with teeth and lobes obtuse or rounded (not bristle pointed); acorns maturing first year (and hence on new wood) and leaves

h. Oblong, sinuate-pinnatifid, nut $\frac{1}{3}$ immersed in the tubercled cup.

38. Q. ALBA.

h^2. Lyrate-pinnatifid, nut $\frac{1}{2}$ or more immersed.

Peduncles shorter than petioles... .....39. Q. MACROCARPA.

Peduncles longer than petioles.....66. Q. BICOLOR.

h^3. Obovate and deeply sinuate-lobed, the two lobes near the summit much the largest.....93. Q. OBTUSILOBA.

*h*⁴. Oblong, undulately crenate-toothed, peduncles shorter than petioles; acorn

Less than 1 in. in length..... . 67. Q. PRINUS.

More than 1 in. in length .....116. Q. MICHEAUXII.

*h*⁵. Lanceolate-oblong; sharply undulate-toothed; acorn small.

68. Q. MUHLENBERGII.

*h*⁶. Elliptical or oblong, evergreen.... .....117. Q. VIRENS.

*h*⁷. Obovate-spatulate, partly deciduous.....118. Q. AQUATICA.

*g*². Leaves with teeth and lobes acute and bristle-pointed; acorns maturing the second year (and hence on old wood); leaves

h. Moderately pinnatifid; cup very shallow and saucer-shaped; scales fine ....15. Q. RUBRA.

*h*². Deeply pinnatifid; lobes

i. Rather broad; inner bark yellowish .....93. Q. TINCTORIA.

*i*². Narrow; sinuses broad and rounded; acorn

Ovoid-oblong, ½ invested in a coarse-scaled cup.

69. Q. COCCINEA.

Flattened-globular, ¼ invested in fine-scaled cup.

94. Q. PALUSTRIS.

*f*³. Involucre 2-4-valved, becoming hard and prickly and inclosing 1-3 sweet, edible, flattened, subglobose nuts; sterile flowers in catkins.

40. CASTANEA VESCA.

*f*³. Involucre 4-valved and inclosing two, 3 cornered, edible nuts.

16. FAGUS FERRUGINEA.

*e*³. Fertile flowers in short catkins; nuts small and achenium-like; sterile flowers destitute of calyx; leaves simple.

f. Nutlet inclosed in a bladder-like bag.....41. OSTYRA VIRGINICA.

*f*². Nutlet not inclosed but subtended by an enlarged leafy bract.

42. CARPINUS CAROLINIANA.

*d*². Both staminate and pistillate flowers in catkins.

e. Ovary and pod 2-celled, many-seeded.

60. LIQUIDAMBAR STYRACIFLUA.

*e*². Ovary 1-2-celled with a single ovule in each cell;

f. Calyx scale-like or none; stigmas 2, filamentous; fertile flowers arranged 2 or 3 together under each scale of the cone-like catkin (*Betula*); bark

g. Brown and close, catkins erect.....44. B. LENTA.

*g*². Yellowish-gray and ragged, catkins sub-erect.....17. B. LUTEA.

*g*³. White, and leaves.

Deltoid, smooth both sides .....70. B. POPULIFOLIA.

Ovate, hairy on veins beneath.....43. B. PAPYRACEA.

*g*⁴. Reddish-brown, shaggy.....95. B. NIGRA.

*f*². Calyx regular and succulent in fruit.....63. MORUS RUBRA.

*e*³. Ovary 1-celled and many-seeded, the seeds at maturity furnished with a hairy tuft (*Salicaceæ*).

f. Bracts of the catkins entire; calyx wanting; stamens 2-7 (*Salix*); catkins on leafy branchlets with yellowish, deciduous scales; capsules glabrous; stamens 3–5: petioles

g. Glandular; scales of catkin entire; leaves

Narrow-lanceolate; fruiting catkins rather dense....45. S. NIGRA.

Lanceolate or ovate lanceolate, glaucous beneath, fruiting catkins very loose..... 71. S. AMYGDALOIDES

g^1. Not glandular; scales dentate.....46. S. ALBA.

f^2. Bracts of the catkins lacerately fringed; calyx a disk-like cup; stamens 8-30, leaves broad (*Populus*); styles with

g. Narrow lobes; capsule small; seeds minute, petioles laterally compressed; leaves

h. Cordate-orbicular, finely serrate.....72. P. TREMULOIDES.

h^2. Ovate-orbicular, coarsely dentate, beneath

Glabrous at maturity.....18 POPULUS GRANDIDENTATA.

Densely tomentose at maturity.....96. POPULUS ALBA.

h^3. Deltoid; branchlets terete.....73. P. DILATATA.

g^2. Broad lobes; capsules large; seeds 1 line or more in length and leaves

Acuminate, smooth, strongly reticulated and whitish beneath. 47. P. BALSAMIFERA.

Obtuse or rounded at apex, tomentose at least along the veins beneath.....97. P. HETEROPHYLLA.

Broadly deltoid; branchlets angled.....48. P. MONILIFERA.

a^2. **Gymnospermæ** — seeds naked, borne superficially on carpellary scales. Cone-bearing (*Coniferæ*); cones with

b. Many imbricated scales, each in the axil of a bract and bearing 2 inverted ovules; seeds winged.

c. Leaves evergreen, fascicled; cones maturing the second year (*Pinus*).

d. Leaves in 2s; cones with scales

e. Smooth (awnless); leaves

5–6 in. long, with long sheaths.....19. P. RESINOSA.

1 in. or thereabouts in length, sheaths short.....99. P. BANKSIANA.

e^2. Armed with a prickle; leaves

f. 2–3 in. long; cone 2–2½ in. long.....122. P. CLAUSA.

f^2. 3–5 in. long; sheaths elongated; branchlets

Rough; prickle inclined nearly at right angle to the axis of cone when closed.....75. P. MITIS.

Smooth; prickle inclined towards the apex of the cone. 123. P. GLABRA.

f^3. 1½–2½ in. long; sheaths short.....98. P. INOPS.

d^2. Leaves in 3s and scales of cone thickened at apex and armed with a prickle; leaves

3–6 in. long, cone about 2 in. long; prickles strong.....50. P. RIGIDA.

5–8 in. long; cone 2–3 in; prickles weak.....121. P. SEROTINA.

8–15 in. long; cone 6–10 in. long.....124. P. PALUSTRIS.

d^3. Leaves in 5s with very short sheaths; cones longer than the leaves and with scales not thickened at the ends, unarmed.....49 P. STROBUS.

d^4. Leaves in both 2s and 3s, 7–12 in. long; cone 3–6 in. long, glossy, brown. 125. P. CUBENSIS.

c^2. Leaves evergreen, scattered (not fascicled); cones with thin scales, maturing the first year (*Abies*).

d. Cones erect, cyclindrical, large (3–4 in.); leaves flat, linear.....22. A. BALSAMEA.

d^2. Cones pendant and bracts inconspicuous.

e. Small, 8 lines or less, scales entire at tip, leaves linear. 21. A. CANADENSIS

e^3. Larger; leaves 4-angled (*Picea*).
1–1½ in. long, scales eroded at tip; branchlets pubescent.
20 PICEA NIGRA.
2-in. long, subentire at tip, branchlets smooth.....100. P. ALBA.
c^3. Leaves deciduous, soft, needle-shaped and in fascicles of many each; cones about 8 lines in length, scales thin (*Larix*) and with inflected margins.
23. L. AMERICANA.
b^2. Few imbricated scales without bracts and each bearing 2 erect ovules.
Flowers monoecious, scales 8–12 (*Thuya*) ..... 24. T. OCCIDENTALIS.
Flowers dioecious, scales fleshy and consolidated, making a small dark blue berry like fruit.....25. JUNIPERS VIRGINIANA.
b^3. Scales peltate with edges joined; cones subglobuse short
⅛ in. in diameter, scales usually 6 (*Chamæcyparis*).....74. C. THYOIDES.
1 in or less in diameter; scales 15–20..... 119. TAXODIUM DISTICHUM.
b^1. Single, naked, drupe-like seed, 1 in. or slightly more in length, sessile.
120. TORREYA TAXIFOLIA.

A KEY, BASED UPON THE LEAVES,

Designed as An Aid in Identifying the Species represented in Parts I, II, III, IV and V when out of season for procuring the Flowers.

N. B.—As this key applies only to the species thus far represented in AMERICAN WOODS it is important always to confirm identification by applying the more detailed description given in its proper place.

a. **Deciduous Leaves** — falling in autumn.
  b. *Simple Leaves.*
    c. Laminate — with well-marked blade and petiole.
      d. Main rib single — pinnately veined.
        e. Entire or nearly so, pointed at both ends and
          f. Opposite
            3–5 in. long, thick, lustrous above .... 9. NYSSA MULTIFORA.
            5–6 in. long, thin, dull above.....89. CATALPA BIGNONIOIDES.
          ***f*².** Alternate, and
            g. Large, thinnish
              Oblong, 5–10 in. long, petioles 1–2 in....1. MAGNOLIA ACUMINATA.
              Obovate-lanceolate, 6–12 in. long, petiole scarcely ½ in.
                76. ASIMINA TRILOBA.
            ***g*².** Smaller, 3–6 in. long, thick, whitish and pubescent at least on the veins beneath.
              ***h*².** Not glaucous but
                Petioles about 1 in. long.....61. DIOSPYROS VIRGINIANA.
                Petioles about ½ in. long ....110. NYSSA OGECHE.
        ***e*².** Serrate, serulate or dentate.
          f. Inequilateral and cordate or truncate at base.
            g. Ovate-orbicular, large, 4–5 in. or more in length.
              3. TILIA AMERICANA.
            ***g*².** Ovate, long-taper-pointed from a broad base.
              12. CELTIS OCCIDENTALIS.
            ***g*³.** Ovate-oblong and
              h. Very rough, especially above, rugose.....11. ULMUS FULVA.
              ***h*².** Smoothish and
                i. 2–4 in. long, fruit in
                  Fascicles.....33. ULMUS AMERICANA.
                  Racemes.....34. ULMUS RACEMOSA.

*i*². 1–2 in. long and only slightly inequilateral.
114. PLANERA AQUATICA.
Flowers and fruit in fascicles..... ...33. ULMUS AMERICANA.
Flowers and fruit in racemes.....34. ULMUS RACEMOSA.

*f*². Equilateral and obtuse, rounded or cordated at base.
g. Veins straight or nearly so, leaves thinnish,
h. Ovate-oblong,
Coarsely serrate with remote teeth, one at the end of each vein, ciliate and covered with silky white hairs.
16. FAGUS FERRUGINEA.
Doubly and sharply serrate, nutlet inclosed in a papery sac.
41. OSTRYA VIRGINICA.
Unequally and sharply serrate, nutlet subtended by a leafy bract.... ....42. CARPINUS CAROLINIANA.
*h*². Ovate and
i. Finely and closely serrate, smooth, whitish and reticulate-veined beneath..... .....47. POPULUS BALSAMIFERA.
*i*². Doubly serrate and
j. Thinnish; petioles downy and of aromatic flavor.
Bark of trunk yellowish-gray .....17. BETULA LUTEA.
Bark reddish-brown . .....44. BETULA LENTA.
*j*². Thickish and bark white .....43. BETULA PAPYRACEA.
*g*³. Veins incurved.
h. Orbicular-heart-shaped, leaves thickish, 4–8 in. long.
Acuminate ....63. MORUS RUBRA.
Obtuse or rounded at apex .....97. POPULUS HETEROPHYLLA.
*h*². Orbicular-ovate; petioles laterally compressed,
Coarsely dentate.....18. POPULUS GRANDIDENTATA.
Serrate-dentate .....72. POPULUS TREMULOIDES.
*f*³. Equilateral and acute at base, tapering both ways.
g. Linear-lanceolate, tomentose on midrib above and petiole.
45. SALIX NIGRA.
*g*². Lanceolate or ovate-lanceolate, long-acuminate; capsules
Sessile or nearly so .....46. SALIX ALBA var. VITELLINA.
With slender pedicels.. .....71. SALIX AMYGALOIDES.
*g*³. Oblong-lanceolate with teeth sharply
Awn-pointed and in about 20 pairs..... 40. CASTANEA VESCA.
Mucronate and in 6–12 pairs .....68. QUERCUS MUHLENBERGII.
Finely glandular-serrate..... ... 55. PRUNUS PENNSYLVANICA.
*g*⁴. Obovate-oblong, serrate, hairy under surface...56. PRUNUS AVIUM.
*g*⁵. Ovate, very smooth and shining.... .....57. PYRUS COMMUNIS.
*g*⁶. Wedge-obovate, veins very prominent,
Thin, smoothish and dull above .....58. CRATAEGUS PUNCTATA.
Thick, smooth and lustrous above...85. CRATAEGUS CRUS-GALLI.
*g*⁷. Ovate-oblong, veins incurved and petioles
h. With 2–4 glands, smooth.....29. PRUNUS SEROTINA.
*h*². Without glands,
Glabrous both sides, sharply serrate.
59. AMELANCHIER CANADENSIS.
Downy under-side and petiole..... ....30. PYRUS MALUS.

*g*⁸. Lanceolate-oblong, 1–3 in. long, about equally acuminate at both ends.....111. FORESTINA ACUMINATA.

*f*⁴. Equilateral and truncate at base,

g. Serrate-dentate with cartilaginous teeth

Deltoid-ovate. .....48. POPULUS MONILIFERA.

Broadly deltoid ....73. POPULUS DILATATA.

*g*². Irregularly serrate or obscurely lobed....70. BETULA POPULIFOLIA.

*e*³. Pinnately lobed; lobes

f. Rounded at apex (not bristle-pointed) and

g. Subequal. .. ..38. QUERCUS ALBA.

*g*². Very unequal.

h. The two lobes next the summit much the largest.

92. QUERCUS OBTUSILOBA.

*h*². Lyrate-pinnatifid and sinuses extending

Nearly to the midrib and roundish..39. QUERCUS MACROCARPA.

Usually not over half-way to the midrid and more acute.

66. Q. BICOLOR.

*f*². Bristle-pointed; sinuses

g. Moderately deep and narrow, lobes broad.....15. QUERCUS RUBRA.

*g*². Deeper and broader; lobes narrower .....93. Q. TINCTORIA.

*g*³. Deep, broad and rounded; lobes very narrow; acorn

Ovoid-oblong, ½ immersed in a coarse-scaled cup.

69. QUERCUS COCCINEA.

Flatened-globular, ¼ immersed in a fine-scaled cup.

94. QUERCUS PALUSTRIS.

*e*⁴. Broad, truncate at both base and apex, and with two spreading lobes on each side..... .....2. LIRIODENDRON TULIPIFERA.

*e*⁵. Wavy and spinous-toothed, very thick.....52. ILEX OPACA.

*e*⁶. Undulately crenate-toothed; obovate-oblong,

Slightly if at all pubescent beneath..... ...67. QUERCUS PRINUS.

Velvety pubescent beneath .....116. QUERCUS MICHAUXII.

*e*⁷. Sinuate-toothed, white-tomentose beneath. .....96. POPULUS ALBA.

*e*⁸. Cut-serrate or sublobate with slender petioles;

Ovate, coarsely cut-serrate.....83. PYRUS CORONARIA.

Round-ovate, finely cut-serrate.....86. CRATÆGUS COCCINEA.

*e*⁹. Crenate-serrate; petioles 1 in. or slightly less in length.

82. PRUNUS CERASUS.

*e*¹⁰. Obscurely crenulate-toothed; leaves

Alternate, petioles long, mostly 1½ in. or more.

87. CORNUS ALTERNIFOLIA.

Opposite, petioles short (less than 1 in.).....88. CORNUS FLORIDA.

*e*¹¹. Doubly crenate-serrate with glandular teeth.....81. PRUNUS NIGRA.

*e*¹². Doubly serrate, rhombic-ovate. .....95. BETULA NIGRA.

*d*². Main ribs several-palmately-veined, etc.

e. Rib single at first but soon sending off a strong vein on each side and leaves 3-lobed, 2-lobed or entire. .... 32. SASSAFRAS OFFICINALE.

*e*². Ribs three at first, but soon five by branching, leaves alternate, base of petiole concave and fitting over the axillary bud.

13. PLATANUS OCCIDENTALIS.

*e*³. Ribs 5–7 from commencement; leaves

f. Opposite base of petiole subtending (not covering) the axillary bud.

g. Moderately incised with broad lobes which are
Sparingly sinuate-toothed..... .....7. ACER SACCHARINUM.
Irregularly serrate and notched... .....53. ACER RUBRUM.
Sharply and finely doubly serrate....79. ACER PENNSYLVANICUM.
*f*². Alternate, tendril bearing vine.....78. VITIS AESTIVALIS.
g. Deeply incised with more or less acute sinuses and narrow divisions. Star-shaped, lobes glandular serrate.
60. LIQUIDAMBAR STYRACIFLUA
Palmate, lobes incisely toothed.....26. ACER DASYCARPUM.
*c*². Linear, sessile in delicate 2-ranked sprays.....119. TAXODIUM DISTICHUM.
*c*³. Needle-shaped — without distinction of blade and petiole — short, about 1 in. in length, soft and in fascicles of many each.....23. LARIX AMERICANA.
*b*². *Compound leaves.*
c. Palmate, with 7, obovate, serrate leaflets.. ...6. AESCULUS HIPPOCASTANUM.
*c*². Pinnate and with an odd terminal leaflet, rachis
d. Finished with prickles..... ...106. XANTHOXYLUM CLAVA-HERCULIS.
*d*². Not-finished with prickles; leaflets all
e. Petiolulate, leaflets
f. 21–41, each with one or two pairs of glandular teeth at its base.
4. AILANTHUS GLANDULOSUS.
*f*². 11–15,
With prickle-like stipules, entire ..... 80. ROBINIA PSEUDACACIA.
With stipules, serrate..... .....84. PYRUS SAMBUCIFOLIA.
*f*³. 7–9, ovate or lance-oblong, entire or obscurely serrate;
Petioles and branchlets glabrous .....10. FRAXINUS AMERICANA.
Petioles and branchlets velvety pubescent.31. FRAXINUS PUBESCENS.
*f*⁴. Lateral leaflets
Petiolulate, irregularly toothed.....54. ACER NEGUNDO.
Sessile, subentire..... .....77. PTELEA TRIFOLIATA.
*e*². Sessile or subsessile
f. Numerous (15–17) and pubescent, especially along the petiole and rachis.
g. Leaflets ovate-lanceolate, finely serrate; pubescence of short, rust-colored clammy hairs.
Fruit subovoid, viscid-pubescent ..... 14. JUGLANS CINEREA.
Fruit globose, roughly dotted (not viscid-pubescent).
35. JUGLANS NIGRA.
*g*². Leaflets lance-oblong, coarsely serrate; pubescence of copious, longer and white hairs.....5. RHUS TYPHINA.
*f*². 11–13..... .....115. CARYA AQUATICA.
*f*³. (5–11).
g. 5, quite glabrous; fruit a ridged nut about 1 in. long with thick epicarp.
36. CARYA ALBA.
*g*². 5–7 or 9, glabrous, epicarp thin; nut
Small, thin-shelled ....91. CARYA MICROCARPA.
Larger, moderately thick shelled.....85. CARYA PORCINA.
*g*³. 7–9, epicarp thick and woody, leaflets
Puberulent, bark shaggy ....64. CARYA SULCATA.
Tomentose and oderous.....90. CARYA TOMENTOSA.

g^4. 7–11,

Lanceolate, acute at base, minutely glandular and pubescent beneath ..... 37. C. AMARA.

Oblong-lanceolate, glabrous, obtuse or rounded at base; fruit a samara, flat at base.....62. FRAXINUS SAMBUCIFOLIA.

b^3. *Decompound Leaves.*

c. Petioles smooth and leaves

d. Regularly bipinnate, leaflets sessile .....105. MELIA AZEDARACH.

d^2. Regularly bipinnate excepting for the lowest pair of single leaflets; leaflets stalked .....27. GYMNOCLADUS CANADENSIS.

d^3. Irregularly bipinnate, leaflets small and sessile,

12–18 in number.....109. GLEDITSCHIA MONOSPERMA.

18–24 in number .....27. GLEDITSCHIA TRIACANTHOS.

c^2. Petioles prickly, leaves large, with ovate, sessile, serrate leaflets. 8. ARALIA SPINOSA.

a^2. **Subdeciduous Leaves** — a part only of the leaves falling in autumn, the rest remaining green through the winter.

Obovate-spatulate, entire, shining green both sides ..118. QUERCUS AQUATICA.

a^3. **Persistent Leaves** — evergreen.

b. Needle-shaped and quite stiff, pointing every way.

c. In fascicles of

d. Two each, a membraneous sheath, inclosing the base of each fascicle, about

1 in. long, sheathes very short.....99. PINUS BANKSIANA.

1½–2½ in. long, sheaths very short; branchlets purple..98. PINUS INOPS.

2–3 in. long, slender with short sheaths.....122. PINUS CLAUSA.

3–5 in. long, slender; branchlets

Rough.. .....75. PINUS MITIS.

Smooth .....123. PINUS GLABRA.

5–6 in. long, thicker, sheaths elongated.....19. PINUS RESINOSA.

d^2. Three each and

3–6 in. long ....50. PINUS RIGIDA.

5–8 in. long.... .... 121. PINUS SEROTINA.

8–15 in. long.....123. PINUS PALUSTRIS.

d^3. Both two and three each ....125. PINUS CUBENSIS.

d^4. Five each, sheath deciduous..... .....49. PINUS STROBUS.

c^2. Not in fascicles (scattered), short, 4-angled and usually more or less curved; branchlets

Pubescent; leaflets rather thick.....20. PICEA NIGRA.

Smooth, leaflets slender .....100. PICEA ALBA.

b^2. Linear, flat and diverging in two directions.

c. Petioled, obscurely denticulate, 8 lines or less in length. 21. ABIES CANADENSIS.

c^2. Subsessile, rigid and sharply bristle-pointed .....120. TORREYA TAXIFOLIA.

c^3. Sessile, entire, 8 lines or more in length..... .....22. ABIES BALSAMEA.

b^3. Scale-like or awl-shaped.

c. Imbricated and closely appressed in four ranks, but making a conspicuously flat and two-edged branchlet .....24. THUYA OCCIDENTALIS.

c^2. Scale-like, smaller, appressed in four ranks and making a rather 4-angled than flat branchlet; fruit a

Small spherical cone.... .....74. CHAMAECYPARIS THYOIDES.

Bluish berry..... 25. JUNIPERUS VIRGINIANA.

*b*⁴. Ovate to obovate

c. 6–12 in. long, thick, entire, acute at both ends.

101. MAGNOLIA GRANDIFLORA.

*c*². 3–6 in. long, blade articulated to the petiole which is

Conspicuously winged; stamens usually 20..... 103. CITRUS AURANTIUM.

Slightly if at all winged; stamens usually 35.....104. CITRUS LIMONUM.

*b*⁵. Lanceolate-oblong.

3–5 in. long, margin

Crenate-serrate ..... 102. GORDONIA LASIANTHUS.

Opposite, glabrous beneath .....112. OSMANTHUS AMERICANUS.

Alternate, pubescent beneath.

113. PERSEA CAROLINENSIS VAR. PALUSTRIS.

2 in. long, entire, glandular beneath.....108. CLIFTONIA LIGUSTRINA.

*b*⁶. Oblong or elliptical, small, 1½–4 in..... ... .117. QUERCUS VIRENS.

*a*⁴. **Leaves Subpersistent** — Evergreen southward but more or less deciduous northward.

Narrow obovate; 1–3 in. long..... .. 107. CYRILLA RACEMIFLORA.

Lanceolate to oval, 3–6 in. long, glaucous beneath....51. MAGNOLIA GLAUCA.

A KEY, BASED UPON THE FRUIT,

Designed as an Aid in Identifying the Species represented in Parts I, II, III, IV and V when in Season for procuring the Fruit.

N. B.— The remarks concerning the use of the Key based upon the Leaves are equally true with reference to this.

a. **Free Fruit** — formed by the ripening of a single pistil either simple or compound.

b. *Indehiscent pericarp.*

c. Samara — dry, usually 1-celled, 1-seeded and with 1-2 membranous wings.

d. In terminal panicles; wing somewhat oblong-lanceolate, with a lenticular seed at about its center, and beyond which the wing is twisted (*Ailanthus*) .. ..4. A. GLANDULOSUS.

***d*².** In terminal cymes, a 2-seeded suborbicular samera, winged all around.
77. PTELEA TRIFOLIATA.

***d*³.** In umbellate corymbs, each pedicel supporting a pair of samaræ with oblanceolate wings, obtuse at the apex and with main rib on outer margin (*Acer*).

e. Fruit maturing in the fall, wings slightly divergent..7. A. SACCHARINUM.

***e*².** Fruit maturing in early summer.

f. Large 1¼ in. or more, downy when young.. .....26. A. DASYCARPUM.

***f*².** Smaller, smooth, pendulous and
Red, in umbels.... ....53. A. RUBRUM.
Greenish in racemes, wings incurved.....54. A. NEGUNDO.

***d*⁴.** In terminal racemes, 2 sameræ on a single pedicel with main rib on outer margin..... ....79. ACER PENNSYLVANICUM.

***d*⁵.** In axillary racemes or panicles, winged at the apex with a more or less lanceolate obtuse wing (*Fraxinus*).

e. Terete at base (seed-bearing portion); branchlets and petioles
Smooth ..... 10. F. AMERICANA.
Velvety pubescent .... 31. F. PUBESCENS.

***e*².** Flat — wing extending along the seed-bearing portion.
62. F. SAMBUCIFOLIA.

***d*⁶.** In lateral fascicles or clusters, winged all round (*Ulmus*).
Sessile or nearly so, cell pubescent and margin not ciliate..11. U. FULVA.
In fascicles, cell smooth, margin densely ciliate.....33. U. AMERICANA.
In racemes, cell pubescent, margin ciliate.....34. U. RACEMOSA.

***c*².** Drupe or drupe-like and with a single seed.

d. Fibro-fleshy and dryish pericarp

e. Small, subglobose (*Rhus*), in terminal thyrses and clothed with crimson, acid hairs.....5. RHUS TYPHINA.

*e*². Large, about 2 in. in length, with edible embyro (*Juglans*).

Ovoid or oblong and clothed with brownish, fragrant-viscid hairs.
14. J. CINEREA.

Globose, roughly dotted (not viscid hairy).....35. J. NIGRA.

*d*². Fleshy pericarp.

e. Ovoid and clustered on axillary peduncles.

g. On the growth of the seasou, clustered 2 or 3 together, about 2½ in. long, blue and

Sessile upon the peduncle ; stone longitudinally striated.
9. NYSSA MULTIFLORA.

With short pedicels ; stone not striated.
113. PERSEA CAROLINENSIS.

*g*². On growth of the previous season....111. FORESTIERA ACUMINATI.

*f*². Racemed, bluish and with short, fleshy, red pedicels.
32. SASSAFRAS OFFICINALE.

*e*². Ovoid-oblong, 1–1¼ in. long, stone compressed.....81. PRUNUS NIGRA.

*e*³. Oblong, tipped with the remnants of the style and about 1 in. in length.

Reddish aud stone longitudinally striated with membranous-edged ridges.....110. NYSSA OGECHE.

Dark blue, stone not membranous-ridged.
112. OSMANTHUS AMERICANUS.

*e*⁴. Ovate, about 1 in. in length, sessile, scaly bracted beneath (though resembling a drupe it is really a naked seed) .120. TORREYA TAXIFOLIA.

*e*⁵. Globular,

f. Purple or purplish black and

g. Solitary, of a sweet sugary flavor.....12 CELTIS OCCIDENTALIS.

*g*². Racemed (or partially so), of a vinous, slightly astringent flavor.
29. PRUNUS SEROTINA.

*g*³. In umbels, larger, of

Acid-vinous flavor, ½ in. in diameter.....82. PRUNUS CERASUS.

Sweet-vinous flavor, ⅝ in. in diameter.....56. PRUNUS AVIUM.

*f*². Red, small and very sour.....55. P. PENNSYLVANICA.

*c*². Drupe-like but containing more than one seed, and seeds

d. Inclosed in a bony

e. 2–3–celled stone

Blue, subglobose, in flat-cymes with red stems.
87. CORNUS ALTERNIFOLIA.

Bright-red, elongated, sessile upon an orange-colored disk.
88. CORNUS FLORIDA.

*e*². 3–5–celled stone; yellowish-white, in loose axillary panicles.
105. MELIA AZEDARACH.

*d*². Distinct. (not inclosed in a common stone) ; fruit

e. Crowned with persistent

f. Calyx-teeth,

Purple-black, 5–seeded, in umbels.....8. ARALIA SPINOSA.

Red or purplish, 4–8 seeded, axillary.....52. ILEX OPACA.

*f*². Style : drupe small about ⅛ in.....107. CYRILLA RACEMIFLORA.

*e*². Not crowned with either calyx-teeth or style, bluish black and scaly bracted beneath .....25. JUNIPERUS VIRGINIANA.

*c*⁴. Nut—hard, single coat, and furnished with an involucral cup or covering,
d. Ovoid oblong or ellipsoidal, surrounded at its base with an involucral cup (*Quercus*), acorn borne
e. On the new wood of the season (subgenus *Leucobalanus*), cup
f. About ½ enveloping the small, ovoid nut; scales thin and appressed.
68. Q. MUHLENBERGII.
*f*². About ½ enveloping the nut
Thick, scales very roughly tubercled, edge of cup rather inturned after shedding the nut; nut usually long-ovoid.....38. Q. ALBA.
Thinner, edges flaring out after shedding the nut, scales thinnish; peduncles shorter than petioles.....67. Q. PRINUS.
*f*³. Scarcely ½ enveloping the oblong-ovoid nut about 1¼ in. in length.
116. QUERCUS MICHAUXII.
*f*⁴. About ½ or more enveloping the nut; peduncles
g. Longer than the petioles; nut ¾ in. long, light-brown.
66. QUERCUS BICOLOR.
½ in. or less long, dark brown.....117. QUERCUS VIRENS.
*f*⁵. About ½ or more enveloping the nut; peduncles
g. Longer than the petioles.....66. Q. BICOLOR.
*g*². Shorter than the petioles; scales very loosely appressed forming a moss-like fringed margin of cup.....39. Q. MACROCARPA.
More closely appressed and not forming a moss-like fringe.
92. Q. OBTUSILOBA.
*e*². On wood of the preceding season (subgenus *Melanobalanus*); cup
f. Saucer-shaped, very shallow, ¼ enveloping the nut.
g. Ovoid-oblong, about 1 in. long.....15. Q. RUBRA.
*g*². Flattened-globose; leaves
Sinuate-pinnatifid.
Sinuate-pinnatifid with wide sinuses....94. QUERCUS PALUSTRIS.
Obovate-spatulate, entire.....118. QUERCUS AQUATICA.
*f*². Top-shaped, ½ enveloping the acorn; scales thin and coarse
Inner bark of tree reddish.....69. Q. COCCINEA.
Inner bark yellowish.....93. Q. TINCTORIA.
*d*². Club-shaped, short, surrounded with stiff hairs, tipped with the persistent recurved style and arranged in globular heads.
13. PLATANUS OCCIDENTALIS.
*d*³. Achenium-like, small and borne in short catkins,
Inclosed in a membranous inflated sac, catkin hop-like.
41. OSTRYA VIRGINICA.
Subtended by an enlarged leafy bract....42. CARPINUS CAROLINIANA.
*c*⁵. Nut-like, dry, not invested with an involucre.
Smoothish, globose, about ¼ in. in diameter, in cymes with leaf-like bract attached.....3. TILIA AMERICANA.
Rough, with scale-like points, ovate, coriacious..114. PLANERA AQUATICA.
*c*⁶. Pod (legume) which is
Oblong, flat, about 2 in. broad and curved.
27. GYMNOCLADUS CANADENSIS.
Linear, twisted and contorted, about 1 in. broad.
28. GLEDITSCHIA TRIACANTHOS.
Obliquely ovate (1–2 in. long), long stalked and mostly 1-seeded.
109. GLEDITSCHIA MONOSPERMA.

c[1]. Pome; capsules
d. Cartilaginous; fruit
e. Sunken at insertion of pedicel,
f. Globular
Large, 1 in. or more, distinctly 5-celled.. ...30. PYRUS MALUS.
Small, more or less 10-celled..... ...59. AMELANCHIER CANADENSIS.
f[2]. Flattened, globose, waxy, fragrant and very tart.
83. PYRUS CORONARIA.
e[2]. Not sunken at insertion of pedicel, pyriform .....57. PYRUS COMMUNIS.
d[2]. Not cartilaginous, 1-5 bony seeds.
$\frac{3}{4}$ in. in diameter; red or yellow with white spots.
58. CRATAEGUS PUNCTATA.
$\frac{1}{2}$ in. in diameter, leaves round-ovate .....86. CRATAEGUS COCCINEA.
$\frac{1}{8}$ in. in diameter, leaves wedge-obovate...85. CRATAEGUS CRUS-GALLI.
c[8]. Berry.
With persistent thickish calyx, large (about 1 in. or more).
61. DIOSPYROS VIRGINIANA.
Without persistent calyx, small, in thyrses..... .78. VITIS ÆSTIVALIS.
c[9]. Fleshy with custard-like edible pulp.....76. ASIMINA TRILOBA.
c[10]. Berry-like pome, $\frac{3}{8}$ in. in diameter and borne in dense clusters.
84. PYRUS SAMBUCIFOLIA.
c[11]. Hesperidum — seeds in juicy pulp and rind leathery.
Subglobose, flattened at the ends .....103. CITRUS AURANTIUM.
Globose-oblong, mammillate at the extremity ....104. CITRUS LIMONUM.
c[12]. Achenium, 3-4-angled and with membranous wing like margins.
108. CLIFTONIA LIGUSTRINA.

b[2] *Dehiscent pericarp.*
c. Subglobose, and
d. Coriaceous or woody, dehiscent by
e. 2-3 valves and containing one or very few large seeds with smooth shining coat and a large scar (*Æsculus*), fruit prickly and leaflets 7.
6. ÆSCULUS HIPPOCASTANUM.
e[2]. 4 more or less distinct valves (*Carya*).
f. Epicarp thick and separating quite freely to the base; nut ridged with thick shell, globular ovoid and
g. Flattened.
1 in. or less in length.....36. CARYA ALBA.
$1\frac{1}{4}$ in. or more in length.....64. CARYA SULCATA.
g[2] Not so much flattened, usually 4 angled.
90. CARYA TOMENTOSA.
f[2]. Epicarp only moderately thick and nut of medium size, moderately ridged and with shell of medium thickness.
65. CARYA PORCINA.
f[3]. Epicarp thin, nuts small and thin-shelled; kernel
g. Astringent and bitter; sutures of epicarp very prominent; nut.
Quite smooth, whitish and only slighly compressed.
37. CARYA AMARA.
Rough, reddish, strongly compressed and angled.
115. CARYA AQUATICA.
g[2]. Slightly if at all bitter, nut whitish and sutures moderately prominent .... 91. CARYA MICROCARPA.

d.[2] Covered with spines; dehiscent by 4 valves.
Nuts sharply three-angled, 2 together, involucre soft-prickly.
16. FAGUS FERRUGINEA.
Nuts subovoid, flattened, 1–3 together, involucral spines very sharp and hard..... 40. CASTANEA VESCA, var. AMERICANA.

c.[2] Small, ovoid-lanceolate pods arranged in catkins, opening by two valves and containing numerous seeds furnished with silky down; leaves

d. Orbicular-ovate; petioles flattened; leaves
Dentate..... 18. POPULUS GRANDIDENTATA.
Finely serrate, sharply pointed.....72. P. TREMULOIDES.
Sinuate-toothed, tomentose beneath.. ..... 96. P. ALBA.
Obscurely-serrate, with obtuse or rounded apex. 97. P. HETEROPHYLLA.

d.[2] Ovate, closely serrate, whitish and reticulate-veined beneath.
47. P. BALSAMIFERA.

d.[3] Deltoid-ovate..... .....48. P. MONILIFERA.

d.[4] Broadly deltoid .....73. P. DILATATA.

d.[5] Linear-lanceolate, tomentose on midrib above and petiole.
45. SALIX NIGRA

d.[6] Lanceolate or elliptic-lanceolate, smooth above; capsules
Sessile or nearly so..... 46. SALIX ALBA var. VITELLINA.
With slender pedicels.....71. S. AMYGDALOIDES.

c[3]. Linear compressed pods, opening by two valves.
80. ROBINIA PSEUDACACIA

c[4]. Subcylindrical pods, long (10–12 in.), opening by two valves.
89. CATALPA BIGNONIOIDES.

c[5]. Ovoid, 5-valved capsule ....102. GORDONIA LASIANTHUS.

c[6]. Subovoid follicle with seeds suspended by funiculi when ripe.
106. XANTHOXYLUM CLAVA-HERCULIS.

a[2]. **Aggregated fruit** — composed of many carpels, either closed or opened and cohering or closely massed together, forming a

b. Cone.

c. Scales of the cone open carpels (*Coniferæ*).

d. Scales many, persistent and spreading at maturity, each subtended by a bract; ovules 2, inverted.

e. Maturing the year after flowering (*Pinus*).

f. Cones oblong-ovoid, scarcely 2 in. long; scales armed with

g. Weak prickles; leaves 3-5 in. long; prickles directed
At about right angles to axis of closed cone.....75. P. MITIS.
Forward at 45° or less from axis.....123. P. GLABRA.

g[2]. Stronger prickle; leaves 1½–2½ in long.....98. PINUS INOPS.

f[2]. Cones ovoid-pyramidal; carpellary scales thickened at the apex and

g. Unarmed (smooth); cones
2 in. in length, straight ....19. PINUS RESINOSA.
Less than 2 in., curved..... 99. PINUS BANKSIANA.

g[3]. Armed with a recurved prickle; cones about
2 in. long; prickle strong..... 50. C. RIGIDA.
2.3 in. long, with weak prickle, and
wide-pyramidal; leaves in 3's... .....121. P. SEROTINA.
Narrow pyramidal; leaves in 2's.....122. P. CLAUSA.
3-6 in. long, glossy brown; leaves in 2's and 3's. 125. P. CUBENSIS.
6-10 in. long; leaves in 3's.....124. P. PALUSTRIS.

*f*³. Cylindric, 4–6 in. long, scales thin and unarmed ... 49. P. STROBUS.

*e*². Maturing the first season — the autumn after blossoming.

f. Ovoid or oblong, ½ in. long, pendent; bracts inconspicuous; scales persistent on the axis, thin and with eroded tip .....20. ABIES NIGRA.

*f*². Ovoid, small (8 lines or less), pendent, scales rounded and entire at tip. 21. ABIES CANADENSIS.

Cyclindrical,

Erect, large (2–4 in.), and scales finally falling away from the axis. 22. ABIES BALSAMEA.

Nodding, small (about 2 in.) scales persisting on the axis. 100. PICEA ALBA.

*f*⁴. Ovoid or roundish, small, 9 lines or less, scales persistent on the axis at maturity..... .....23. LARIX AMERICANA.

*d*². Scales few, persistent, bractless; cone

Oblong and erect, with loosely imbricated scales somewhat thickened at the tip, seeds winged all round .....27. THUYA OCCIDENTALIS.

Spherical, about ½ in. in diameter, with 3 pairs of peltate scales. 74. CHAMAECYPARIS THYOIDES.

*d*³. Scales not spreading at maturity, but breaking irregularly; cones globose. 119. TAXODIUM DISTICHUM.

*c*². Scales 3-lobed bracts each subtending 2–3 closed, indehiscent carpels — miniature samaræ (*Betula*).

f. Cones erect,

Sessile, ovoid-oblong, 1 in. in length ... .17. BETULA LUTEA.

With downy peduncle, ovoid, smaller .....95. BETULA NIGRA.

*f*². Cones suberect, ovoid-oblong; scales thicker and with short divergent lobes: wing of nutlet not broader than the body .....44. B. LENTA.

*f*³. Cones pendent, cyclindrical and about

1 in. in length ....70. B. POPULIFOLIA.

1⅜ in. in length..... ...43. B. PAPYRACEA.

*c*³. Scales closed carpels, growing from an elongated receptacle and consolidated together.

d. Dehiscent at maturity along the medium line of the back, and letting out each 1–2 berry-like seeds suspended by extensile threads (*Magnolia*); cone

Cyclindrical, curved, 2–3 in. long ... .1. MAGNOLIA ACUMINATA.

Oblong, 1–1½ in. long ....51. MAGNOLIA GLAUCA.

Oval, 3–4 in. long... ....101. MAGNOLIA GRANDIFLORA.

*d*². Indehiscent at maturity and falling away as samaræ. 2. LIRIODENDRON TULIPIFERA.

*b*². Spherical head, hardened and bristling with 2-beaked capsules. 60. LIQUIDAMBAR STYRACIFLUA.

*b*³. Sorosis — a spike with bracts and calyx-lobes all thickened and succulent. 63. MORUS RUBRA

A SYSTEMATIC STUDY

OF THE

Species whose Woods are Represented in the Accompanying Sections.

The timbers comprised in the series, which this text is designed to accompany, belong to what are known, botanically speaking, as *Flowering* and *Exogenous Plants*. At the outset, therefore, we will, once for all, define these groups; and, as the characters herein given are equally true of all the species enumerated in the following pages, they need not be repeated in the further definition of the various sub-groups and species.

FLOWERING or PHÆNOGAMOUS PLANTS.

Vegetables producing flowers which consist essentially of stamens and pistils, the latter bearing ovules or seeds.

In distinction from the *Flowering plants* are the *Flowerless* or *Cryptogamous Plants*, comprising the rest of the vegetable kingdom, from the very simply organized Slime Moulds and Bacteria up to the highly organized Ferns and Club-Mosses. But in the study of timbers this group is unimportant, as only in a few rare cases do any of its representatives attain the dimensions of trees. Those exceptions are the Tree-Ferns of tropical countries — gigantic ferns, which sometimes attain the height of fifty or sixty feet, with straight shafts quite like tree trunks and tops consisting of a bunch of enormous plume-like fronds. They, however, are of practically no value as timber.

EXOGENOUS or DICOTYLEDONOUS PLANTS.

Flowering plants whose stems consist of a central column of pith surrounded by wood in concentric layers, and this in turn by bark; the stems increasing in thickness by the addition of a new layer each year to the wood externally and to the bark internally. Leaves mostly netted-veined. First leaves of the embryo (cotyledons) two and opposite, or (in the Coniferæ) several in a whorl. Parts of the flower in fours or fives, very rarely in threes.

A second class of *Flowering Plants* and comprising the rest of the group is the *Endogenous* or *Monocotyledonous Plants*, characterized by having stems in which the

wood occurs as threads or bundles running through a cellular, pith-like tissue so that a transverse section exhibits the wood as dots and not in concentric rings. Leaves mostly parallel-veined. Embryo with single cotyledon, or rarely two, and then alternate and unequal. Parts of the flower generally in threes. In southern United State and elsewhere in or near the tropics trees are found, such as the Palms, etc., which belong to this class, but none that we have to do with at present.

Exogenous plants are subdivided into two well-marked groups or sub-classes — *Angiospermæ* and *Gymnospermæ*. The former includes by far the greater part of the Flowering Plants, and most of the species represented in "American Woods" are representatives of it.

ANGIOSPERMÆ.

Flowering, exogenous plants in which there is a complete pistil — with stigma and closed ovary — containing ovules which develop into seeds at maturity. This sub-class comprises many groups of plants known as *Orders*, and such as are represented by plants which attain the dimensions of trees, within the limits of the United States, we propose to consider in the following pages:

ORDER **MAGNOLIACEÆ**: MAGNOLIA FAMILY.

Leaves alternate, simple, coriaceous, entire or lobed (never toothed), marked with minute transparent dots, feather-veined; leaf buds covered with membranous stipules, which soon fall away. *Flowers* single, large, polypetalous, polyandrous, polygamous, hypogenous, perfect; sepals and petals colored alike, in three or more circles of three each, imbricated in the bud, deciduous; anthers adnate; pistils numerous, packed together and covering the elongated receptacle, and forming in *Fruit* a sort of fleshy or dry cone containing one or two seeds in each carpel, with a minute embryo in fleshy albumen.

Trees or shrubs with aromatic and bitter bark.

GENUS MAGNOLIA, L.

Leaves folded lengthwise in the bud, embracing and embraced by the sheathing stipules. Leaf-buds conical. *Flowers* large, fragrant: sepals 3; petals 6-9; anthers longer than the filaments and opening inward; carpels 2-valved and 2-seeded, aggregated and coherent in a mass. *Fruit* a fleshy, somewhat woody cone, each carpel opening at maturity along its back, letting out its 1 or 2 berry-like seeds, suspended each by a long, extensile thread.

Trees and shrubs. (Genus named in compliment to Prof. Pierre Magnol, an early French botanist.)

101. MAGNOLIA GRANDIFLORA, L.*

BIG LAUREL, BULL BAY, MAGNOLIA.

Ger., *Grossblumige Magnolia;* Fr., *Grand Magnolier;* Sp., *Magnolia floregrande.*

SPECIFIC CHARACTERS: — *Leaves* evergreen, thick, coriaceous, entire, oblong to ovate or obovate, 6 to 12 in. in length, acute at both ends, bright shining green above, more or less rusty tomentose beneath, with straight prominent mid-rib and

* *Magnolia fœtida*, Sarg.

stout petioles 1 to 2 in. in length, which as well as the new growths and bud-scales are densely tomentose. *Flowers* (April to Aug) large, 6–9 in. across when fully expanded, white, very showy and deliciously fragrant ; sepals petal-like ; petals 6 to 12, obovate, clawed, concave ; base of filaments and receptacle purple. *Fruit* oval, 3–4 in. long, rusty pubescent, and seeds about ½ in. in length, somewhat triangular and compressed.

(The specific name *grandiflora* is from the Latin *grandis large,* and *flos, flower.*)

A most beautiful tree of pyramidal habit of growth, attaining the hight of 80 ft. (24 m.) at times, with a trunk 3 or 4 ft. (1 m.) in diameter. The bark of trunk is of a light gray color with patches of whitish and on small or medium-size trunks smooth ; on the largest trunks checking longitudinally to moderate depth and flaking off in thinnish scales, while occasionally individuals are found with numerous curious bosses projecting out an inch or more from the otherwise smooth bark.

HABITAT.— From North Carolina southward to Mosquito Inlet, Florida, and westward into Texas, confined principally to the maritime districts, growing in rich, moist soil, and attaining its greatest development in Louisiana.

PHYSICAL PROPERTIES.— Wood quite heavy and hard, close-grained, satiny and of a creamy white color, the heart-wood being not easily distinguishable from the abundant sap-wood. *Specific Gravity,* 0.6360; *Percentage of Ash,* 0.53; *Relative Approximate Fuel Value,* 0.6326; *Coefficient of Elasticity,* 90330; *Modulus of Rupture,* 792; *Resistance to Longitudinal Pressure,* 482; *Resistance to Indention,* 197; *Weight of a Cubic Foot in Pounds,* 39.64.

USES.—Wood very suitable for interior finishing, cabinet work, boxes, etc., and is largely used for fuel. As an ornamental tree it is unquestionably the foremost in value of the American forests, being extensively planted in parks and private grounds in the southern cities, and found to be hardy as far north as Washington, or, in sheltered places, Philadelphia. It has long been extensively grown in Europe, where several varieties have originated.

MEDICINAL PROPERTIES.— The bark of this species possesses the gently stimulant, tonic and diaphoretic properties common to the other Magnolias. (See *M. acuminata* and *Liriodendron Tulipifera,* Part I, pp. 39 and 41.)

ORDER **TERNSTROEMIACEÆ** : TEA OR CAMELIA FAMILY.

Leaves simple, alternate, pinnately veined, without stipules. *Flowers* regular, hypogynous, calyx-lobes imbricated in æstivation; petals distinct and also imbricated in æstivation; stamens numerous, and more or less united with each other (5 adelphous) and with the petals at their bases. anthers 2-celled, introrse. *Fruit* a woody 3-5-celled capsule, dehiscent at maturity by slits in the sides, and containing few seeds with little or no albumen, and large embryo with broad cotyledons.

Order represented by trees and shrubs with showy flowers, of which the Tea plant and Camelia are important members. But few representatives found in this country.

GENUS GORDONIA, ELLIS.

Leaves as described for the Order. *Flowers* solitary and perfect, with five unequal concave rounded sepals, usually 5 obvate petals, numerous stamens united in 5 clusters, each cluster adhering to the base of a petal, or united into a tube; style 1. *Fruit*, an ovoid capsule with 5 valves, which open at maturity and separate from the persistent axis; cells containing each 2-8 pendulous albumenless seeds, with straightish embryo, short radicle and thin cotyledons plaited lengthwise.

Shrubs and small trees. (Genus named in compliment to Jas. Gordon, a physician of Abeerdeen, but the honor was afterwards transferred to a distinguished nurseryman of the same name.)

102. GORDONIA LASIANTHUS, L.

LOBLOLLY BAY, TAN BAY.

Ger., *Langstielige Gordonie;* Fr., *Gordonia à feuilles glabres;* Sp., *Gordinia.*

SPECIFIC CHARACTERS.—*Leaves* evergreen, coriaceous, lanceolate-oblong, crenate-serrate with very short teeth, but entire and narrowing at base into a short channeled petiole. *Flowers* (June to Aug.) on slender peduncles, 2-3 inches long; calyx velvety pubescent outside, and its ovate lobes ciliate-margined; petals white; puberulent outside, 1¼ in. or more in length and slightly less in breadth; tube of the filaments short; pistil with short style and pubescent ovary. *Fruit* capsule ovoid, and containing flat, nearly square, wingless seeds, scarcely 1-16 in. in length, with oblique wing about ⅛ in. in length.

(*Lasianthus*, which Linnaeus used with a capital L, for reasons not apparent, is from the Greek λάσιος, *hairy*, and ἄνθος, flower.)

A handsome evergreen tree occasionally attaining the height of 75 ft. (23 m.) with trunk perhaps 18 in. (0.45 m.) in diameter, with rather upright branches and narrow top. In places where soil is poor and conditions unfavorable it is found blooming as a shrub. The bark of trunk is of a reddish-brown color, deeply fissured longitudinally so as to form long firm rounded or narrow-topped ridges.

HABITAT.— From southern Virginia southward along the coast to Florida, and westward along the Gulf coast to Louisiana, growing in swamps and wet bottom-lands.

PHYSICAL PROPERTIES.— Wood very light, soft, not strong, easily worked, of close grain and with numerous fine medullary rays; color reddish brown and ample pinkish-white sap-wood. *Specific Gravity*, 0.4728; *Percentage of Ash*, 0.76; *Relative Approximate Fuel Value*, 0.4692; *Coefficient of Elasticity*, 79414; *Modulus of Rupture*, 670; *Resistance to Longitudinal Pressure*, 387; *Resistance to Indentation*, 99; *Weight of a Cubic Foot in Pounds*, 29.46.

USES.—The wood of this tree is employed to some extent in cabinet-making, etc., and the bark has been used for tanning. The trees have been occasionally set for ornamental purposes, and are particularly suitable for moist localities.

MEDICINAL PROPERTIES.—None are known of this species.

ORDER **AURANTIACEÆ**: ORANGE FAMILY.

Leaves altenate, with 1–3 leaflets articulated with the often winged petiole, exstipulate, gland-dotted. *Flowers* regular 3–5-numerous; sepals and petals inserted upon a hypogynous disk; stamens with flat filaments distinct or cohering in one or more sets; pistil with single terminal style and compound ovary. *Fruit*, a berry consisting of several carpels, with thick rind, juicy pulp and exalbuminous soft-shelled seeds attached to the inner angle of each carpel; cotyledons thick.

Trees and shrubs abounding, in nearly all parts of the plant, in small transparent receptacles of a sweet and pungent volatile oil.

GENUS CITRUS, L.

Leaves shining evergreen, oval to lance-ovate, entire or serulate, often with axillary spines, further as described for the genus. *Flowers* are borne on axillary or terminal single or several-flowered peduncles, waxy white or pink-tinted and deliciously fragrant; sepels 5; petals 5; stamens polyadelphous with 10 or more (usually in multiples of 5) versatile anthers. *Fruit* as described for the order; varying from light yellow to a reddish golden color, of delightful fragrance, the rind copiously supplied with volatile oil glands, and the pulp with a free acid.

Small trees and shrubs of great beauty, especially when adorned with the fragrant flowers and fruit. (*Citrus* is from the Greek κίτριον, the *citron* or *lemon*.)

103. CITRUS AURANTIUM, L.

ORANGE.

Ger., *Orangenbaum;* Fr., *Oranger;* Sp., *Naranjo,*

SPECIFIC CHARACTERS: — *Leaves* ovate to ovate-oblong, crenulate, and petiole winged. *Flowers* as described for the genus; anthers usually 20. *Fruit* globose, flattened at the ends, of a reddish-golden color, delightfully fragrant, of a more or less acid and generally sweet and delicious flavor.

(The specific name, *Aurantium*, is from the Latin *aurum, gold.*)

Small or medium-size trees, rarely attaining the hight of 30 ft. (10 m.) and with a trunk 18 in. (0.45 m.) in diameter, though usually much smaller than the above dimensions, with full rounded head and smooth brownish-gray bark of trunk usually with fine streaks of yellowish in old trees.

Nowhere in the realm of trees can a more beautiful object be found than the Orange tree with its lustrous dark green foliage and laden with its golden fruit; or at a certain season of the year with its waxy fragrant flowers and fruit in all stages of development at the same time.

HABITAT. —The native home of the Orange is supposed to be India, where it is now said to be found among the Himalaya mountains bearing sweet fruit. It has been extensively introduced into countries of warmer climates throughout the world, and in many localities, as in Florida for instance, it has become thoroughly naturalized.

PHYSICAL PROPERTIES. — Wood heavy, hard, strong, of very close grain and susceptible of a smooth polish; of a light lemon yellow color, little difference being seen between the heart-wood and sap-wood

USES.—The delicious and wholesome fruit of this tree is too well-known to require comment, being extensively grown in all warm countries and probably enjoyed,—thanks to our modern facilities of transportation — in every portion of the civilized world. An essential oil, the Oil of Orange Flowers, is distilled from the flowers of both the Sweet and the Bitter Oranges (the latter being preferred), and is much used by the manufacturers of confections, perfumes, etc. The Oil of Orange Peel is likewise a valuable product for flavoring purposes, and the leaves of the plant are valuable for infusions.

The wild Bitter-sweet Orange tree is occasionally planted in the streets of southern cities purely for ornamental purposes, and a fine is imposed by city ordinance to prevent wanton picking of the fruit and hence marring the ornamental value of the tree.

The wood is used in turnery, for which it is admirably suited.

MEDICINAL PROPERTIES.—Various parts of the plant are used in medicine. The leaves, which are bitter and aromatic, are employed in some places in the form of infusion as a gently stimulant diaphoretic. Bitter Orange Peel is a mild tonic, carminative and stomachic; the Sweet Orange peel is simply aromatic, but neither is much used alone. They are chiefly employed to communicate a pleasant flavor to other medicines, to correct their nauseating properties, and to assist their stimulant impression upon the stomach.*

NOTE.—The Bitter-sweet Orange, which is the form found in a wild state in Florida and characterized from the cultivated trees mainly by the bitter-acid and rather more rugose fruit, is not considered specifically distinct; probably only a degenerate form. It must have been introduced into Florida at a very early period, as we learn from Brown's *Trees of America*, that Bartram in speaking of the vicinity of New Smyrna, as long ago as 1791, states that "I was there about ten years ago, when the surveyor ran the lines of the colony, where there was neither habitation nor cleared field. It was then a famous orange grove, the upper or south promontory of a ridge nearly half a mile wide and stretching north about forty miles. * * * All this was *one entire orange grove*, with live oaks, magnolias, palms, red bays and others." And Audubon in 1832 states that "Whatever its original country may be supposed to be, the wild orange is, to all appearances, indigenous in many parts of Florida, not only in the neighborhood of plantations, but in the wildest portions of that wild country, where there exist groves fully a mile in extent."

* *U. S. Dispensatory*, 16th ed., pp. 274-276.

104. CITRUS LIMONUM, L.

Lemon.

Ger., *Limonenbaum;* Fr., *Citronnier;* Sp., *Limon.*

Specific Characters: —*Leaves* quite like those of the Orange, but with petioles slightly, if at all, winged. *Flowers* often with pinkish tinge on outer surface and with more numerous stamens, about 35. *Fruit* oblong-spheroidal, mammillate at the extremity, with light yellow rind and very acid tart pulp.
(*Limonum* is from the Arabic name of the tree, *laimun.*)

A very handsome evergreen, quite like the Orange in appearance, or rather more shrubby in habit of growth and not attaining so great a size.

Habitat.—The Lemon, as the Orange, is supposed to have come originally from tropical Asia, and is now found in a wild state in northern India. It is very extensively introduced into tropical and subtropical regions throughout the world and has become naturalized in places.

Physical Properties.—Wood heavy, hard, strong, very close-grained and susceptible of a very smooth polish. It is of a clear light lemon-yellow color, little difference being discernible between the heart and the sap-woods.

Uses.—The importance of the acid and peculiarly agreeable fruit of this tree is known everywhere. The Oil of Lemon is an essential oil obtained by expression or distillation from the peel and is valuable as a flavoring agent. The Lemon tree is likewise of highest ornamental value though not grown purely for that purpose as is the Bitter Orange sometimes.

Medicinal Properties.—The rind of the lemon is sometimes used to qualify the taste and increase the power of stomachic infusions and tinctures. The juice is refrigerent, and, properly diluted, forms a refreshing and agreeable beverage in febrile and inflammatory affections. It may be given with sweetened water in the shape of lemonade, or may be added to the mildly nutritive drinks, such as gum-water, barley-water, etc., usually administered in fevers. One of the most beneficial applications of lemon juice is to the prevention and cure of scurvy, for which it may be considered almost a specific. Such is the importance of taking lemons on long voyages at sea, for the prevention of scurvy, that in England every foreign-going ship is required by law to take such a supply of lemon juice that every seaman should have a daily allowance of an ounce, after having been ten days at sea. It has been used with benefit as a local application in sunburn, etc., and as a gargle in diphtheretic sore throat.*

*U. S. Dispensatory, 16th ed., p. 876.

ORDER MELIACEÆ.

Leaves alternate, usually pinnately compound, exstipulate. *Flowers* mostly regular and perfect; calyx small, the lobes imbricated or rarely valvate in æstivation; petals hypogynous, 3-7, valvate or imbricated in æstivation and free or coherent or adnate to the staminal tube; stamens usually double the number of petals and inserted with them, the filaments joined into a tube (monadephous); pistil with single style and entire, 2-celled ovary free and sheathed at the base with a more or less developed and free hypogynous disk, each cell containing 1-several ovules. *Fruit* various, dry or fleshy; seeds usually destitute of albumen.

Trees and shrubs of hot climates.

GENUS MELIA, L.

Leaves bipinnate with toothed leaflets. *Flowers* in handsome axillary panicles; calyx with 5 small united sepals; petals oblong, spreading; stamen-tube 10-cleft at the apex and furnished with 10 anthers in the throat; pistil with a small hypogynous disk, 5-lobed stigma, columnar and finally deciduous style and 5-celled ovary, each cell containing 2 ovules one above the other. *Fruit* a drupe with 5-celled bony nut (or fewer-celled by obliteration,) cells 1-seeded.

Genus represented by trees of few species. (*Melia* is from the Greek *μέλι, honey.*)

105. MELIA AZEDARACH, L.

PRIDE OF INDIA, CHINA BERRY, CHINA TREE, BEAD TREE.

Ger., *Paternosterbaum,* Fr., *Azedarach,* Sp., *Cinamomo.*

Specific Characters.—Leaves, deciduous, glabrous, with obliquely lance-ovate acuminate, serrate leaflets. *Flowers,* handsome, pleasantly fragrant, and with lilac-colored nearly glabrous petals. *Fruit,* a subglobose drupe, yellowish when ripe, about ½ in. diameter, with sweetish and it is said poisonous pulp, and hanging in loose clusters on the otherwise bare tree throughout the winter.

(The specific name, *Azedarach,* is from the Persian *azad-i-drukht,* meaning *tree of pre-eminence.*)

A beautiful tree rarely surpassing 40 ft. (12 m.) in height or 2 ft. (0.60 m.) in diameter of trunk, and when growing alone where it can display its natural habit of growth, sends out its branches in a manner very much suggesting the rays of an umbrella. The bark of trunk is of a reddish-gray color, separating tardily with age in fibrous closely adhering ridges. It is a striking tree at all seasons, from its peculiar form of growth, handsome foliage, lilac-like inflorescence, and in winter its ample bunches of whitish berries.

HABITAT.—The native country of this tree is said to be Persia, whence it has been introduced extensively as an ornamental tree throughout southern Europe, etc. In the Southern States of America it has in localities long been thoroughly naturalized, and may be found now in abandoned fields forming groves of natural growth.

PHYSICAL PROPERTIES.—Wood of medium hardness and strength, coarse-grained and with annual rings marked by many large open ducts. It is of a rich mottled bay color, with light yellowish green sap-wood occupying but one or two rings.

Uses.—The principal point of usefulness of the China-berry is its high ornamental value, which has long been recognized as testified by the abundance of large trees adorning alike the city streets and country homes of the Southern States. Its wood is little used though it would seem to be very appropriate for nice furniture, as it is certainly a very handsome wood and quite similar in properties to the Mahogany to which it is allied.

The name *Bead-tree* and the German *Paternosterbaum* are both given to it from a use sometimes made of the pits of the fruit for rosaries by the monks of some of the European monasteries.

Medicinal Properties.—The decoction of this bark is cathartic and emetic, and in large doses is said to produce narcotic effects similar to those of spigelia, especially if gathered at the season when the sap is mounting. Robins eating of the sweetish fruit, of which they are very fond, are often rendered so far insensible as to be picked up under the tree; though they usually recover in a few hours. The bark is considered in the Southern States an efficient anthelmintic, the form of decoction being usually preferred.*

Note.—The rapidity of growth of this tree under most favorable conditions is something prodigious. One felled for the accompanying sections measured sixteen inches in diameter, and the annual rings show that it required only nine years for growth; the greatest growth being indicated by its second ring, which measured two and one-eighth inches in thickness on one side.

Order **RUTACEÆ**: Rue Family.

Leaves simple or compound, alternate or opposite, exstipulate, dotted with translucent glands and containing an aromatic or acrid volatile oil. *Flowers* regular, usually 3–5-numerous, hypogynous; stamens as many or twice as many as the sepals or rarely more; pistils 2–5, separate or compound with ovary containing as many cells, raised on a prolongation of the receptacle (gymnophore) or glandular disk, styles commonly united even when ovaries are distinct. *Fruit* usually capsular with few seeds, large embryo and fleshy albumen.

A large family of both herbaceous and woody plants, mostly of the Old World and southern hemisphere.

Genus XANTHOXYLUM, Linnaeus.

Leaves alternate, mostly odd-pinnate with the petioles often furnished with prickles (as are also the branchlets); leaflets entire or crenulate. *Flowers* dioecious, small, greenish-white, and borne in axillary or terminal, pedunculate cymes; sepals 4–5, or wanting in one species; petals 4–5, imbricated in the bud, or rudimentary or wanting in the pistillate flowers: stamens 4–5, alternate with the petals, hypogynous, with introrse 2-celled anthers, opening longitudinally; pistils 1–5, raised on a fleshy stipe, connivent or slightly united; styles short and stigmas capitate; ovary 1-celled and containing 2 amatropous pendulous ovules. *Fruit* a broadly ovate fleshy 2-valved follicle, dehiscent along the ventral suture and containing 1–2 orbicular-oblong seeds suspended by a funiculus, with smooth and shining, blackish, crustaceous seed-coat; embryo straight and cotyledons broad and foliaceous.

A large and widely distributed genus of trees and shrubs with bitter-acrid juice, and name derived from the Greek ξανθός yellow, and ξύλον wood.

* *U. S. Dispensatory*, 16th ed. p. 278.

106. XANTHOXYLUM CLAVA-HERCULIS, L.

PRICKLY ASH, SEA ASH, TOOTHACHE TREE, PEPPER-WOOD.

Ger., *Eschenblättriger Gelbholz;* Fr., *Frêne des epines;* Sp., *Jantoxaro.*

SPECIFIC CHARACTERS:—*Leaves* late-deciduous, mostly glabrous, 5–8 in. long, with leaf-stalk armed with prickles and 3–8 pairs of ovate to ovate-lanceolate leaflets besides the terminal one, 1–2½ in. long, oblique and often falcate, shining above, crenulate-serrate and sessile or nearly so. *Flowers* in large terminal cymes, 4–5 in. long, appearing when the leaves are about half-grown, on slender pedicels; sepals 5, minute, persistent; petals 5, white ⅛ to ¼ in. in length; pistils 3–5, with short styles. *Fruit* ripe in Aug. or Sept., an oblique-ovoid, 1-seeded, brown follicle, ¼ in. long, with rugose surface, in dense clusters, the black seed hanging outside at maturity.

Variety *fruticosum* is a form found in southern Florida and western Texas with 3-foliate and more or less pubescent leaves, and with small ovate-oblong, crenulate, coriaceous leaflets; a shrub or small tree.

(The specific name *Clava-Herculis*, is the Latin for *club of Hercules*, and is suggested by the spinous nature of the trunks.)

A small tree, very rarely more than 40 ft. (12 m.) in height or 12 in. (0.30 m.) in diameter of trunk, with rounded top and short trunk which is vested with a very curious bark. This is thin, of a gray color and smooth, except for the irregularly pyramidal, corky bosses which here and there protrude an inch more or less from its surface. These are wide at the base and contract to a rounded apex which is primarily tipped with a prickle, though from their exposed situations the prickles become easily dislodged. The branches are smooth and armed with straight chestnut-brown, wide-based and sharp prickles. The juices of the tree are of a very acrid, pungent flavor.

HABITAT.—From southern Virginia southward near the coast to about the latitude of Tampa, Fla., and westward along the Gulf States to western Texas, growing in the rich soil of bottom-lands, or in the east in the sandy soil near the coast.

PHYSICAL PROPERTIES.—Wood light, moderately hard and strong, fine grain, with numerous fine medullary rays and susceptible of a very smooth satiny polish. It is of a delicate light brown color with abundant light yellow sap-wood. *Specific Gravity*, 0.5056; *Percentage of Ash*, 0.82; *Relative Approximate Fuel Value*, 0.5015; *Coefficient of Elasticity*, 72577; *Modulus of Rupture*, 640; *Resistance to Longitudinal Pressure*, 449; *Resistance to Indentation*, 159; *Weight of a Cubic Foot in Pounds*, 31.51.

USES.—The wood of this tree is very little used, but the bark is in considerable demand, especially by the colored people in the south, as a popular remedy for the tooth-ache, and its remedial virtues are said to have been well known to the aborigines of America.*

* Brown's *Trees of America*, p. 151.

The Prickly Ash is occasionally planted for ornamental purposes.

MEDICINAL PROPERTIES. — Xanthoxylum is stimulant, and as a remedy in chronic rheumatism it enjoys some reputation in this country. The powdered bark has sometimes been employed as a topical irritant.*

ORDER **CYRILLACEÆ**: CYRILLA FAMILY.

Leaves alternate, exstipulate. *Flowers* regular, perfect, 5-numerous, in terminal or lateral racemes; petals hypogynous, imbricated in the bud; stamens 5-10, inserted with the petals on an annular disk united with the base of the ovary, anthers introrse, opening lengthwise: pistil with stigma entire or lobed, ovary 2-4-celled with usually a single pendulous ovule in each cell. *Fruit* a achenium or drupe, and seed with straight embryo, in fleshy albumen.

Shrubs and trees of the Southern States of America.

GENUS CYRILLA, L.

Leaves alternate, exstipulate, mostly at the ends of the branchlets, coriaceous, narrow-obvate to obovate-oblong, entire, short-pointed, rounded or slightly emarginate at apex, reticulate veined and with short petioles. *Flowers* in slender, rigid, spreading racemes from near the extremity of the growth of the previous year, small, with slender pedicels, in the axils of one or two persistent bracts; calyx with 5, persistent, acute lobes: petals white or rose-colored, about ⅛ in. long, acute, deciduous, furnished inside with nectiferous gland; stamens shorter than the petals and opposite the calyx-lobes, with subulate, thick filaments and introrse anthers; pistil free, with short thick style, stigma with two spreading lobes and 2-celled ovary, each cell containing anatropous ovules suspended in a cluster from its apex. *Fruit* a broadly ovoid drupe crowned with the persistent style, 2-celled, 2-seeded and with spongy pericarp.

(Genus named in compliment to Domenico Cyrillo, an Italian naturalist.)

107. CYRILLA RACEMIFLORA, L.

RED TITI, LEATHER-WOOD, IRON-WOOD.

Ger., *Traubenblättrige Cyrille* Fr., *Cyrille de Caroline;* Sp., *Madera de hierro.*

SPECIFIC CHARACTERS:— *Leaves* 1½ to 3 in. long, glabrous, shining green and grooved along the mid-rib above, turning to light orange-red and falling late in the northern part of its range, evergreen in the south; young twigs with large leaf-scars and bearing prominent ridges which continue down one from the base of each leaf. *Flowers* appear in early summer, in straight racemes 3 6 in. long, at first rigid but finally drooping. *Fruit* a small, dryish drupe no often more than ¼ in. in diameter, and many remaining on the tree into the first and even second season.

(The specific name is descriptive, in Latin, of the form of flower-cluster, i. e. raceme-flowered.)

A small tree occasionally attaining the height of 30 or 35 ft. (10 m.) with wide-spreading top and irregular trunk about 12 in. (0.30 m.) in diameter, and clothed in a peculiar soft and spongy reddish-brown bark which flakes off in irregular friable scales. It is a beautiful tree, especially when bearing its abundant racemes of white flowers, which sometimes are so numerous as almost to prevail over the lustrous dark-green of the foliage. Often it grows as simply a large shrub sending up many stems from a common root.

* *U. S. Dispensatory*, 16th ed., p. 1606.

HABITAT.—From North Carolina southward along the coast to middle Florida and westward into Texas, growing in the moist soil of rich bottom lands, the borders of streams, swamps and the pine-barren ponds.

PHYSICAL PROPERTIES.—Wood heavy, hard, rather brittle, of very close grain and susceptible of a very smooth polish. It is of a delicate reddish-brown color, with buff-white sap-wood. *Specific Gravity,* 0.6784; *Percentage of Ash,* 0.42; *Relative Approximate Fuel Value,* 0.6756; *Coefficient of Elasticity,* 48828; *Modulus of Rupture,* 314; *Weight of a Cubic Foot in Pounds,* 43.28.

USES.—Little use is made of this wood, though its properties would suggest a usefulness in turnery, as for tool-handles, etc. As an ornamental tree it is occasionally planted, but not as generally as its merits would justify.

MEDICINAL PROPERTIES.—"The spongy bark produced at the base of the trunk is pliable and absorbent and has been recommended as a styptic; it is astringent, and said to have a cicatrizing effect on wounds." *

GENUS **CLIFTONIA**, BANKS.

Leaves oblong-lanceolate, entire, about 2 in. long, coriaceous, evergreen, terminating in a blunt or slightly emarginate apex, light-green above, paler and furnished with glands beneath. *Flowers* appear in very early spring, in short terminal many-flowered erect racemes, regular, perfect, delightfully fragrant, with slender pedicles and each appearing in the axils of one or two pointed, membranous, bracts, which fall away before the expansion of the flowers; calyx with 5-8 minute persistent lobes, imbricated in æstivation; petals 5-8, hypogynous, spreading, obovate, concave, imbricated in æstivation; stamens 10, hypogynous, in two ranks, those of the outer rank being longer and are opposite the sepals, those of the inner alternate with the sepals; filaments flat and wide at base, abruptly contracted above and subulate; anthers introrse, with two cells opening by longitudinal slits; pistil with subsessile, 2-4-lobed stigma and 2-4-celled ovary, which is surrounded at its base by a cup-like hypogynous disk; a single anatropous ovule being suspended from the apex of each cell. *Fruit* oblong, achenium-like, considerably resembling a grain of Buckwheat,† scarcely ½ in. in length, 3-4-angular, with thin membranous wing-like margins and crowned with the persistent stigma, with spongy pericarp and containing 2-4 cells, each with a single fusiform seed with thin embryo and fleshy albumen.

(Genus named in compliment to Dr. Francis Clifton, an English physician.)

108. CLIFTONIA LIGUSTRINA, BANKS.‡

TITI, BUCKWHEAT TREE.

Ger., *Buckweizenbaum;* Fr., *Cliftonie à feuilles de Troene.*

SPECIFIC CHARACTERS are incorporated in the above generic description as this is the only species.

(The specific name, *ligustrina,* is from *ligustrum,* the ancient Latin name of the European Privet.)

A small tree of upright habit of growth, rarely attaining the dimensions of 40 ft. (12 m.) in hight and 15 in. (0.40 m.) in diameter of trunk at base,

* Sargents' *Silva of North America,* II p. 2.

† The resemblance of this fruit to that of the Buckwheat is what gives the tree the name Buckwheat-Tree, though a name not in common usage.

‡ *Cliftonia monophylla,* Britton.

but usually much smaller and in the southernmost part of its range a mere shrub. The bark of trunk is of a grayish-black color, checked into firm and fine longitudinal ridges, and these when flaking off on the bases of the largest trunks expose a layer of thin reddish-brown papery scales. Often it is hardly more than a tall shrub, and growing in very dense and almost impenetrable thickets of great extent and where the stems are crooked and very near together. Its lustrous foliage and showy clusters of fragrant flowers in earliest spring make this tree at that season a most attractive object.

Habitat.—The coast region from South Carolina to central Florida and thence westward into Louisiana, growing in moist swampy soil, particularly the swamps of the pine-barrens, and reaching its greatest development in western Florida.

Physical Properties.—Wood heavy, rather hard, with many fine medullary rays, very close-grained and susceptible of a smooth polish. It is of a reddish-brown color with lighter sap-wood. *Specific Gravity*, 0.6249; *Percentage of Ash*, 0.42; *Relative Approximate Fuel Value*, 0.6223; *Coefficient of Elasticity*, 78250; *Modulus of Rupture*, 526; *Resistance to Longitudinal Pressure*, 371; *Resistance to Indentation*, 147; *Weight of a Cubic Foot in Pounds*, 38.95.

Uses.—The wood from this tree is little used except for fuel, and for that it is highly prized.

The Titi should be more extensively planted for ornamental purposes, as it is one of the most beautiful of our trees in earliest spring-time. It would be particularly appropriate for moist places, which would be perhaps too moist for other trees more commonly planted.

Medicinal Properties are not recorded of this species.

Order **LEGUMINOSÆ**: Pulse Family.

Leaves alternate, usually compound, entire and furnished with stipules. *Flowers* with 5 sepals more or less united at the base; petals 5, papilionaceous or regular; stamens, diadelphous, monadelphous or distinct and with versatile anthers; pistil single, simple and free. *Fruit* a legume (pod) with mostly albumenless seeds.

Genus GLEDITSCHIA, Linnaeus.

Leaves abruptly once or twice pinnate and often the two forms on the same specimen. *Flowers* polygamous, greenish and inconspicuous, in small spike-like racemes; calyx short, with 3–5 spreading lobes; petals 3–5, inserted on the base of the calyx and the two lower sometimes united; stamens 3–5, occasionally more (and part of them may be abortive), distinct, opposite the sepals and inserted on the base of the calyx; style short. *Fruit* a flat pod containing solitary or numerous flat seeds and often a sweet pulp.

Trees furnished with branched thorns which are usually supra-auxiliary. (Named in compliment to John G. Gleditsch, a German botanist and friend of Linnaeus.)

109. GLEDITSCHIA MONOSPERMA, WALT.*

WATER LOCUST.

Ger., *Einsamiger Honigdorn;* Fr., *Fevier Monosperme;* Sp., *Algorrobo Aquatico.*

SPECIFIC CHARACTERS.—*Leaves* irregularly bicompound, with 6–9 pairs of leaflets or 3–4 pairs of pinnæ, the longest nearest the apex of the leaf; leaflets ovate-oblong, about 1 in. in length, obtuse or rounded at apex, slightly crenate or entire below, shining green above, paler beneath; thorns usually 3–5 in. in length, simple or sending out 1 or 2 lateral thorns, often compressed. *Flowers* (May or June) as described for the genus, racemes slender, 3–4 in. long, with purple puberulous peduncles; ovary long-stipitate, glabrous. *Fruit* a bright chocolate-brown, obliquely ovate, long-stalked pod, 1 in. or less in width and 1–2 in. in length, with stout pointed apex, pulpless, growing in loose racemes and containing usually each a single seed about ½ in. or less across, with orange-brown testa and thick albumen.
(The specific name is from the Greek μόνος, solitary, and σπέρμα, seed.)

A tree of medium size, rarely over 60 ft. (18 m.) in hight, or 2 ft. (0.60m.) in diameter of trunk, with stout spreading branches which form a rather irregular top. The bark of trunk is of a greyish-brown color, thin and quite smooth, only slightly checking with age and flaking off in small scales Its fruit ripens in late summer and falls in autumn.

HABITAT.—Along the coast from South Carolina southward to Florida and westward through the Gulf States into Texas; also up the bottom-lands of the Mississippi Valley to Southern Illinois and Indiana, most abundant west of the Mississippi River and generally rare to the eastward. It grows in moist rich low-lands and in river-swamps subject to occasional inundation.

PHYSICAL PROPERTIES.— Wood very heavy, hard and strong, taking a smooth polish; of a rich reddish-brown color and with abundant light yellow sap-wood. *Specific Gravity,* 0.7342; *Percentage of Ash,* 0.73; *Relative Approximate Fuel Value,* 0.7288; *Coefficient of Elasticity,* 116991; *Modulus of Rupture,* 1027; *Resistance in Longitudinal Pressure,* 584; *Resistance to Indentation,* 276; *Weight of a Cubic Foot in Pounds,* 45.76.

USES.— Little use is made of this tree, though the properties of its wood would seem to make it valuable where a strong and not too large timber is required.

MEDICINAL PROPERTIES.— So far as we can ascertain none have been discovered of this species.

ORDER **CORNACEÆ**: DOGWOOD FAMILY.

Leaves opposite (except in one species), simple, mostly entire. *Flowers* in cymes, often involucrate, polypetalous (exceptionally apetalous), 4-numerous; calyx-tube adherent to the ovary, its limb minute; petals valvate in the bud, oblong, sessile,

* *Gleditschia aquatica*, Marsh.

and, with the stamens, borne on an epigynous disk in the perfect flowers; ovary 1-celled, bearing a single suspended ovule; style single, somewhat club-shaped. *Fruit* a 1-2-seeded baccate drupe, bearing the persistent limb of the calyx.

Trees, shrubs or rarely herbs, with bitter, tonic bark.

GENUS NYSSA, L.

Leaves mostly entire, but sometimes angulate-toothed, and mostly at the ends of the branchlets. *Flowers* greenish and appearing with the leaves, dioecious or polygamous, clustered or rarely solitary on axillary peduncles. *Staminate flowers* more numerous, and in these the calyx-tube is small, limb truncate or 5-parted; petals usually 5, small, oblong and soon deciduous or wanting; stamens 5-12, commonly 10, inserted outside of a convex glandular disk, filaments slender; anthers short; ovary none. *Pistillate flowers* much larger than the staminate; calyx-tube oblong, adherent to the ovary, limb a mere rim as with staminate flowers; petals 2-5, as in staminate flowers, or wanting; ovary 1-celled, style large, revolute, stigmatic down one side. *Fruit* an ovoid or oblong, one-seeded drupe, with a striated stone.

110. NYSSA OGECHE, MARSHALL.*

OGEECHEE LIME, SOUR TUPELLO, GOPHER PLUM.

Ger., *Weisslicher Tupelobaum;* Fr., *Tupelo blanchatre;* Sp., *Lima de Ogeechee.*

SPECIFIC CHARACTERS.—*Leaves* oblong-oval to obovate, 4-6 in. long, usually acute or rounded and apiculate at apex, cuneate to rounded at base, mostly entire, short-petiolate, coriaceous, dark-green and with minute, scattering, appressed hairs above, paler and pubescent beneath (especially when young, more glabrous later), with stout mid-veins and petioles rufous-tomentose. *Flowers* appear in March or April, the *perfect* fls. solitary, about ⅛ in. or less in length, on short tomentose peduncles furnished at the apex with two bractlets; calyx deep cup-shaped, 5-lobed tomentose; petals 5, also tomentose outside, stamens 5-10, included, with short filaments and small anthers; pistil with short exserted style reflexed from near its base. *Sterile flowers* minute, 20 or more together in a globular head, with peduncle ¾ to 1½ in. in length, furnished outside with pale hairs; calyx short, 5-toothed; petals oblong, rounded at apex; stamens 5-10, inserted beneath the edge of a thick disk, longer than the petals and with anthers larger than in the perfect flowers, tubercled and rough. *Fruit* ripe soon after mid-summer, reddish, oblong or obovoid, 1 in. or a little more in length, glabrous, tipped with the remnant of the style and borne on tomentose stems about ½ in. in length, and thickened at the extremity; flesh juicy and strongly but agreeably acid; stone oblong, nearly as long as the drupe, compressed and shell marked with 10 to 12 longitudinal ridges which are continued into papery septa; seed compressed and furnished with thick albumen.

(The specific name is given to this tree from the name of a river in Georgia, the Ogeechee, along which this tree is found in considerable abundance.)

A tree rarely over 50 ft. (15 m.) in height with a short thick trunk sometimes 3 or 4 ft. (1 m.) in diameter, and dividing low down into two or three large forks or sending out irregularly spreading branches. The bark of trunk is of a brownish-gray color with firm longitudinal ridges which are more or less divided by transverse fissures into irregular squares and polygons.

HABITAT.— The Ogeechee Lime is found from the valley of the Savannah River through Georgia to northern Florida, growing along low river-banks and swamps subject to frequent inundation. It is rare and local in its distribution.

* *Nyssa capitata*, Walter.

PHYSICAL PROPERTIES.—Wood light, soft and tough, very close grained and with numerous very fine medullary rays, splitting with difficulty on account of a marked interlacing of the fibers, as with other representatives of the genus, and of a light chocolate-brown color with an abundant whitish sap-wood. *Specific Gravity*, 0.6413; *Percentage of Ash*, 0.34; *Relative Approximate Fuel Value*, 0.4597; *Coefficient of Elasticity*, 68083; *Modulus of Rupture*, 682; *Resistance to Longitudinal Pressure*, 431; *Resistance to Indentation*, 155; *Weight of a Cubic Foot in Pounds*, 28.75.

USES.—The wood of this rare tree is little used, but its fruit is sometimes made into a conserve in regions where abundant.

MEDICINAL PROPERTIES.—None are known of this species.

ORDER **OLEACEÆ**: OLIVE FAMILY.

Leaves opposite and simple or pinnately compound. *Flowers* monopetalous (rarely apetalous or polypetalous); calyx 4-cleft, toothed or entire, or sometimes wanting, corolla regular, 4-cleft (or sometimes 4 petalous, or even wanting altogether); stamens only 2 (or rarely 4); ovary 2-celled with usually 2 suspended ovules in each cell. *Fruit* fleshy or capsular, containing 4 (or fewer) seeds.

Represented by trees and shrubs.

GENUS **FORESTIERA**, POIRET.

Leaves simple, opposite and often fascicled, deciduous. *Flowers* small, dioecious, apetalous, in clusters from long scaly buds in the axils of last year's leaves; the *staminate* sessile, crowded; calyx with 4, minute oblong caducous sepals; stamens 2–4, with oblong anthers laterally dehiscent; the *fertile* flowers on 1–3-flowered, umbellate peduncles; calyx obsolete; pistil with slender style; stigma capitate and slightly 2-lobed; ovary ovoid 2-celled, each cell containing 2 pendulous ovules. *Fruit* a small ovoid 1-celled and 1-seeded drupe.

(Genus named in compliment to M. Forestier, a French physician.)

III. FORESTIERA ACUMINATA, POIR.

SWAMP PRIVET.

Ger., *Sumpf-Rainweide;* Fr., *Troene marecageux;* Sp., *Alheña pantanosa.*

SPECIFIC CHARACTERS.—*Leaves* small, 1–3 in. long, ovate to lance-oblong, about equally acuminate at both ends, serrate above, thin, glabrous, green both sides and with slender petioles. *Flowers* appear in early spring before the leaves, as described from the genus. *Fruit* a glabrous, purple, fleshy, elongate-oblong, usually pointed drupe.

(The specific name, *acuminata*, is the Latin for *pointed* and is descriptive of the leaves).

A small tree occasionally attaining the hight of 40 ft. (12 m.) with trunk 12 or 16 in. (0.40 m.) in diameter, and thin smoothish, light yellowish-brown bark with peculiar small straight transverse fissures surrounded by small elevated ridges. This peculiar formation would seem to indicate a very considerable stretching of the outer layer before checking. Often the Swamp Privet is but a large shrub sending up clusters of large stems.

Habitat.—From southern North Carolina southward to northern Florida, westward into Texas and up the Mississippi valley to southern Illinois and Indiana, growing in wet soil and particularly along the banks of sluggish streams and river-swamps subject to inundation. In these localities when covered with its yellow flowers it is quite a conspicuous object. We were impressed with that feature as we were riding down the Apalachicola River soon after the middle of February, when the deciduous trees were quite as bare as in midwinter. The Swamp Privet with its masses of yellow bloom, and the Red Maple with its deep crimson keys were in conspicuous relief against the generally prevailing somber gray of the Spanish Moss and naked branches on all sides.

Physical Properties.—Wood light, soft, not strong, of very close grain, with fine medullary rays and yielding a smooth polish. The heart-wood is of a light brown color and the abundant sap-wood nearly white. *Specific Gravity*, 0.6345; *Percentage of Ash*, 0.72; *Relative Approximate Fuel Value*, 0.6299; *Coefficient of Elasticity*, 70282; *Modulus of Rupture*, 717; *Resistance to Longitudinal Pressure*, 401; *Resistance to Indentation*, 107; *Weight of a Cubic Foot in Pounds*, 39.54.

Uses.—This wood is little used owing to its limited abundance of proper size, though its properties would suggest a usefulness in turnery etc.

Medicinal Properties.—So far as known this tree does not possess any medicinal properties.

Genus OSMANTHUS, Loureiro.

Leaves simple, opposite, entire or toothed, persistent and without stipules. *Flowers* polygamo-dioecious, appearing in spring or autumn, in short axillary racemes or cymes, or axillary or terminal fascicles, with pedicels subtended by scale-like bracts; calyx campanulate with 4 short lobes, persistent; corolla white or yellowish, with 4 ovate, obtuse spreading lobes; stamens 2 or rarely 4, with slender filaments and 2-celled anthers opening by longitudinal slits along their sides; pistil with columnar style, capitate, entire stigma, and 2-celled ovary, containing 2 laterally attached, pendulous, anatropous ovules in each cell. *Fruit* a drupe, usually 1-seeded, tipped with the remnant of the style, with thin fleshy epicarp, and thick hard stone; seed with elongated embryo and fleshy albumen.

(*Osmanthus* is from the Greek ὀσμή, *odor*, and ἄνθος, *flower*, alluding to the fragrance of the flower of the type species.)

112. OSMANTHUS AMERICANUS, B. and H.

Devil-wood, Wild Olive.

Ger., *Amerikanischer Oehlbaum;* Fr., *Olivier d'Amerique;* Sp., *Madera del diablo.*

Specific Characters.—*Leaves* lanceolate-oblong to narrow obovate, 4–5 in. long, generally acute at apex and gradually narrowed to a broad stout petiole, entire, with revolute margin, thick, coriaceous, glabrous, lustrous green above at maturity, with straight veins and conspicuous mid-rib depressed above, prominent beneath, and small

veins obscure, involute in vernation. *Flowers* appear in March, from buds formed during the previous autumn, in the axils of the leaves, short pedicillate and borne three together in pedunculate cymes or short panicle-like clusters; bracts scale-like, keeled and persistent; calyx with acute rigid lobes; puberulous outside; about $\frac{1}{8}$ in. long and wide when expanded, stamens inserted on about the middle of the corolla-tube and scarcely exserted, smaller or rudamentary in the pistillate flowers; pistil abruptly contracted into the style and slightly exserted, in the staminate flowers rudimentary. *Fruit* ripe in early autumn, ovoid or oblong, about 1 in. in length, dark-blue; flesh dry and thin; stone pointed and seed with thin brown coat marked with pale radiating veins.

A small tree rarely attaining the hight of 50 ft. (15 m.) and with trunk 10 or 12 in. (0.30 m.) in diameter, clothed in a dark brown bark, which checks irregularly and flakes off in small fragments and scales. Commonly it is only a tall shrub.

HABITAT.—The coast region from North Carolina southward to about the latitude of Tampa Bay in Florida and thence westward into Louisiana, growing generally in moist rich soil along the courses of streams, the borders of swamps, etc.

PHYSICAL PROPERTIES.—Wood heavy, very strong, hard and difficult to split (hence the name, Devil-wood), of very fine grain, with thin medullary rays and numerous lines of open ducts arranged in an irregularly radiate manner from the center. It is of a reddish color, with ample pinkish-white sap-woood. *Specific Gravity*, 0.8111; *Percentage of Ash*, 0.46; *Relative Approximate Fuel Value*, 0.8074; *Coefficient of Elasticity*, 123133; *Modulus of Rupture*, 1051; *Resistance to Longitudinal Pressure*, 547; *Resistance to Indentation*, 247; *Weight of a Cubic Foot in Pounds*, 50.55.

USES.—This wood is not much used, though its properties would suggest its great appropriateness for tool-handles, mallets, etc.

MEDICINAL PROPERTIES are not ascribed to this species.

ORDER **LAURACEÆ**: LAUREL FAMILY.

Leaves alternate, simple, generally marked with pelucid dots and (as with the bark) aromatic. *Flowers* in clusters; sepals 4–6; colored, slightly united at the base, strongly imbricated in 2 rows in the bud; petals absent; stamens definite with 2–4 celled anthers which open by recurved lid-like valves; pistil solitary, free, 1–celled, 1–ovuled and with single style. *Fruit*, a drupe or berry with single suspended anatropous albumenless seed. Trees and shrubs.

GENUS PERSEA, GAERTNER.

Leaves entire, evergreen. *Flowers* perfect, greenish or white, in small axillary pedunculate clusters or cymes, without involucre; calyx 6–parted, persistent; stamens 12 in 4 rows, those of the innermost sterile and rudimentary; anthers 4-celled, one pair above the other, opening by uplifted valves; anthers of three stamens extrorse, the others introrse. *Fruit*, an ovoid drupe with peristent calyx at base and containing a single large seed.

Genus represented by trees and shrubs of which the delicious Avogado or Alligator Pear, the *P. gratissima* is one represntative. (*Persea* is a classical name of some Oriental sacred tree.)

113. PERSEA CAROLINENSIS, Nees. var. PALUSTRIS, Ch. †

Swamp Red Bay.

Ger., *Rother Lorberbaum;* Fr., *Persea de Carolina;* Sp., *Laurel Colorado.*

Specific Characters. — *Leaves* oblong to oblong-lanceolate, about equally pointed at both ends, 4–6 in. in length, with short petioles ¼–¾ in. in length, with coriaceous, entire, revolute margins and strong straight midrib, smooth, deep green above, glaucous beneath; branchlets glabrous. *Flowers* small, in close, simple or compound, long-pedunculate cymes, with short pedicels; calyx-lobes coriaceous, the three outer smaller. *Fruit,* a blue drupe scarcely ½ in. in length, usually two or three together, with red stem.

Varietal Characters.—The variety *palustris* differs from the species, as described above, in having the new growths petioles, flower-clusters and under surface of the leaves throughout and the veins above and below densely ferruginous tomentose. *Flowers* are slightly larger and on longer peduncles. The variety is confined to swampy localities, and not generally growing as large as the other.

A small tree with irregular top, rarely over 60 ft. (18 m.) in hight, and with trunk 12 or 16 in. (0.33 m.) in diameter, clothed in a reddish brown bark furrowed into prominent and rather firm ridges. The juices of leaves, inner bark, etc., are pleasantly aromatic.

Habitat.—From North Carolina near the coast to Florida and westward to Mississippi, on low swampy ground.

Physical Properties.— Wood heavy, hard, strong, close-grained, compact, taking a smooth polish, containing many fine medullary rays and ducts quite uniformly distributed; of an orange-brown color and with buff-white sap-wood. *Specific Gravity,* 0,6396; *Percentage of Ash,* 0.37; *Relative Approximate Fuel Value,* 0.6372; *Coefficient of Elasticity,* 84918; *Modulus of Rupture,* 820; *Resistance to Longitudinal Pressure,* 367; *Resistance to Indentation,* 192; *Weight of a Cubic Foot in Pounds,* 39.86.

Uses.—When found large enough this timber is useful for interior finishing, for furniture, shipbuilding, etc.

Medicinal Properties are not known of this species.

Order **ULMACEÆ**: * Elm Family.

Leaves simple, alternate; stipules caducous. *Flowers* perfect or polygamous by abortion, apetalous, in loose clusters, not catkins; calyx somewhat bell-shaped, free from the ovary; stamens springing from the calyx, usually as many as its lobes and opposite them; filaments straight, ovary 1–2-celled with a single suspended ovule in each cell; styles or stigmas two. *Fruit,* a samara or drupe with suspended seed; no albumen.

Represented by trees, rarely shrubs.

Genus PLANERA, Gmelin.

Leaves very much like those of the Elm but smaller. *Flowers* monœcio-polygamous, inconspicuous, appearing before the leaves in small auxiliary clusters; calyx

* Ranked by some authors as a sub-order of the order *Urticaceæ.*
† *Persea palustris, Sarg.*

campanulate, 4–5-cleft; petals none; stamens 4–5, anthers extrorse; pistil with two spreading oblong styles stigmatic down the inner sides, and an ovoid, 1-celled and 1-ovuled ovary. *Fruit* a nut-like, dry, coriaceous, not winged and indehiscent capsule; straight embryo and no albumen.

Genus represented by trees of few species, only one of which is found in this country. (It was named in compliment to John J. Planer, a German botanist.)

114. PLANERA AQUATICA, GMEL.

PLANER TREE.

Ger., *Ulmenblättrige Planera;* Fr., *Planera aquatique;* Sp., *Planera aquatica.*

SPECIFIC CHARACTERS.—*Leaves* small, 1–2 in. in length, ovate, often slightly inequal at base, nearly glabrous, serrate and with short petioles. *Flowers* in auxiliary clusters of 2–5 each. *Fruit* an ovate, nut-like capsule rough with scale-like points.

A large shrub or small tree, with upright habit of growth quite similar to that of the Elms, and rarely attaining the hight of 40 ft. (12 m.) and 18 in. (0.45 m.) in diameter of trunk, with thin smooth brown bark flaking off in irregular, round-pointed scales.

HABITAT.—From North Carolina southward through northern Florida, and westward into Texas, growing in rich bottom-lands and swamps subject to occasional inundations.

PHYSICAL PROPERTIES.— Wood moderately soft and light, with close grain, numerous fine medullary rays and with an arrangement of fine ducts in lines similar to that seen in the Elms, but finer; of a light brown color with light yellowish-brown sap-wood. *Specific Gravity,* 0.5294; *Percentage of Ash,* 0.45; *Relative Approximate Fuel Value,* 0.5270; *Coefficient of Elasticity,* 55167; *Modulus of Rupture,* 621; *Resistance to Longitudinal Pressure,* 394; *Resistance to Indentation,* 146; *Weight of a Cubic Foot in Pounds,* 32.99.

USES.— Such is the scarcity of this wood in size suitable for commercial purposes that it is very little used, though of very good qualities.

MEDICINAL PROPERTIES are not claimed of this species.

ORDER **JUGLANDACEÆ**: WALNUT FAMILY.

Leaves alternate, pinnate and without stipules. *Flowers* monœcious and apetalous, except in some cases in the fertile flowers. *Sterile flowers* in catkins with an irregular calyx adnate to the scale of the catkin. *Fertile flowers* solitary or in small clusters, with calyx regularly 3–5-lobed, adherent to the incompletely 2–4-celled, but 1-ovuled, ovary. *Fruit* a sort of dry drupe (a tryma), with a fibrous and more or less fleshy and coriaceous outer coat (shuck) very astringent to the taste, a hard, bony inner coat (shell), and a 2–4-lobed seed, which is orthotropous, with thick, oily and often corrugated cotyledons and no albumen.

All representatives of the order are trees.

GENUS CARYA, NUTT.*

Leaves odd-pinnate with few leaflets; leaf-buds scaly and from them appear generally both kinds of flowers, the fertile at the extremity of the growth and the sterile at the base, the leaves between. *Sterile flowers* in slender, imbricated, mostly forked catkins; scales 3-parted; calyx mostly 3-parted; stamens 3-10, free filaments short or wanting and anthers hairy. *Fertile flowers* clustered 2-5 together, their common peduncle terminating the shoot of the season; calyx 4-cleft, superior; petals none; stigmas sessile, 2-lobed, the lobes bifid, papillose, persistent. *Fruit* (October) with a coriaceous but at length dry and hard epicarp (shuck), finally falling away in 4-valves, and a smoothish horny endocarp (shell) with a 2-lobed nucleus.

Trees with hard bark, very tough wood and continuous pith; pubescence stellate. (*Carya* is the ancient Greek name — *Καρία* — of the Walnut.)

115. CARYA AQUATICA, NUTT.†

WATER HICKORY, SWAMP HICKORY, BITTER PECAN.‡

Ger., *Sumpf-Hickory;* Fr., *Noyer aquatique;* Sp., *Nogal acuatico.*

SPECIFIC CHARACTERS.—*Leaflets* 11-13, lanceolate-acuminate, somewhat oblique and inequilateral, subentire, shining green, slightly pubescent below, the lateral leaflets sessile, the terminal petiolulate. *Flowers* as described for the genus; lobes of the staminæ catkins nearly equal in length, the lateral ones broader. *Fruit* compressed-globular, pedunculate with thin epicarp having prominent sutures and splitting quite freely to the base; nut angular, rugose, with very thin reddish shell and bitter, astringent, much convoluted kernel with purple testa.

A medium size tree occasionally attaining the height of 60 or 70 ft. (20 m.) with a trunk 30 in. (0.90 m.) in diameter, but usually of smaller dimensions, with bark of trunk furrowed longitudinally with scaly rather closely adherent ridges.

HABITAT.— Along the sea-board from Virginia southward to about the latitude of Tampa Bay, and thence westward in the Gulf States into Texas; northward in the Mississippi valley to Missouri, growing in rich low bottomlands and river-swamps.

PHYSICAL PROPERTIES.— Wood moderately heavy and hard, strong, with numerous thin medullary rays and fine open ducts more uniformly distributed through the year's growth than in the other Hickories, and hence causing the annual rings to be less sharply defined. It is of a reddish brown color with abundant creamy-white sap-wood very commonly spotted and streaked with purple-brown. These spots seem to be caused by the infiltration of some substance along certain ducts, and it is so hard as to turn the edge of the hardest steel. *Specific Gravity,* 0.7407; *Percentage of Ash,* 1.27; *Relative Approximate Fuel Value,* 0.7313; *Coefficient of Elasticity,* 101261; *Modulus of Rupture,* 884; *Resistance to Longitudinal Pressure,* 486; *Resistance to Indentation,* 274; *Weight of a Cubic Foot in Pounds,* 46.16.

* *Hicoria,* Rafinesque.
† *Hicoria aquatica* (Michx. f) Britton.
‡ Britton *Bulletin Torrey Botanical Club* XV, P. 284.

USES.—This is perhaps the poorest wood produced by the Hickories and is little used save for fuel, fencing, etc.

MEDICINAL PROPERTIES.—Although this species in particular is not mentioned as possessing medicinal properties doubtless those known of the others of the genus are also true of this, viz.: the aromatic and astringent properties of the leaves, and the astringent and bitter properties of the inner bark which are made use of in the treatment of dyspepsia, intermittent fever, etc. (See *Carya alba*, Part II, pp. 36.)

ORDER **CUPULIFERÆ**: OAK FAMILY.

Leaves alternate, simple, straight-veined; the stipules forming the bud-scales, deciduous. *Flowers* monœcious, apetalous. *Sterile flowers* in clustered or racemed catkins (or in simple clusters in the Beech); calyx regular or scale-like; stamens 5–20. *Fertile flowers* solitary, clustered or spiked, and furnished with an involucre which forms a cup or covering to the nut; calyx-tube adherent to the ovary, its teeth minute and crowning the summit; ovary 2–7-celled with 1–2 pendulous ovules in each cell, but all of the cells and ovules, except one, disappearing before maturity; stigmas sessile. *Fruit* a 1-celled, 1-seeded nut, solitary or several together, and partly or wholly covered by the scaly (in some cases echinate) involucral cup or covering; seed albumenless, with an anatropous, often edible, embryo; cotyledons thick and fleshy.

Represented by both trees and shrubs.

GENUS QUERCUS L.

Flowers greenish or yellowish. *Sterile flowers* in loose, slender, naked catkins, which spring singly or several together from axillary buds; calyx 2–8-parted or cleft; stamens 3–12; anthers 2-celled. *Fertile flowers* with ovary nearly 3-celled and 6 ovuled, 2 of the cells and 5 of the ovules being abortive; stigma 3-lobed; involucre developing into a hard, scaly cup around the base of the nut or acorn, which is 1-celled and 1 seeded.

(The ancient Latin name for the Oak supposed to be from the Celtic *quer*, *fine* and *cuez*, *tree*.)

116. QUERCUS MICHAUXII, NUTT.

BASKET OAK, COW OAK, SWAMP CHESTNUT OAK.

Ger., *Korb-Eiche*; Fr., *Chêne de panier*; Sp., *Roble de canasto*.

SPECIFIC CHARACTERS:—*Leaves* 5–8 in. long, oval to obovate oblong, acute or accuminate, obtuse or occasianally cordate at base, prominently pinnately veined and regularly and coarsely but not deeply crenate-toothed, rather thick, shining green and smooth above and usually pale gray and fine velvety beneath. *Flowers* with usually 10 stamens; stigma subsessile and abortive ovules at the base of the perfect seed. *Fruit* a large oblong-ovoid acorn maturing the first year, sometimes 1½ in. in length, scarcely half immersed in the rather shallow and hoary cup, with hard stout acute, tuberculate scales without fringe, short pedunculate, inner side of nut-shell glabrous kernel sweetish and edible.

A majestic Oak sometimes attaining the height of 100 ft. (30 m.) or more with a trunk even 6 or 7 ft. (2 m.) in diameter, clothed in a light-gray bark which is rough with longitudinal loose scaly ridges.

Habitat.—From Delaware to Florida and thence into eastern Texas; west of the Alleganies, from southern Indiana, Illinois and Missouri to the Gulf, growing in rich moist bottom-lands and along the borders of streams subject to inundation.

Physical Properties.— Wood heavy, very hard and strong, durable in contact with the soil, medullary rays few and large, and annual layers marked prominently with large open ducts. It is of a light reddish-brown color with buff-white sap-wood. *Specific Gravity*, 0.8039; *Percentage of Ash*, 0.45; *Relative Approximate Fuel Value*, 0.8003; *Coefficient of Elasticity*, 96373; *Modulus of Rupture*, 1118; *Resistance to Longitudinal Pressure*, 482; *Resistance to Indentation*, 233; *Weight of a Cubic Foot in Pounds*, 50.10.

Uses.—The most valuable white oak of the Southern States it is used extensively in the manufacture of agricultural implements, wheel stocks, furniture, for fencing, cooperage, baskets, fuel, etc. The edible acorns are devoured with avidity by the hogs and sheep.

Medicinal Properties are not recorded of this species although those common to most of the Oaks and mentioned of the White Oak (Part II, p. 28) are doubtless true of this also.

117. QUERCUS VIRENS, Ait.

Live Oak.

Gen., *Immergrune Eiche;* Fr., *Chêne vert;* Sp., *Roble siempre verde.*

Specific Characters.— *Leaves* small, 1½–4 in. long, coriaceous, evergreen, oblong or elliptical, obtuse, or rounded at apex, tapering to a short petiole, with entire and revolute margin (rarely with few rounded or pointed teeth), lustrous green above, paler and hoary beneath, as with the petioles, peduncles and new growths, especially when young. *Flowers* with 6–8 stamens; stigmas subsessile; abortive ovules at the base of the perfect seed. *Fruit* a small ovoid-oblong dark-brown abruptly pointed acorn, maturing the first year, about ½ in. in length, ¾ immersed in the top-shaped cup composed of many thin membranous, pointed, hoary scales and borne 1 to 3 together, sessile upon conspicuous peduncles about 1 in. in length; kernel sweetish bitter.

(The specific name, *virens*, the Latin for *green*, refers to the evergreen foliage.)

This interesting evergreen oak attains the hight of 60 or 70 ft. (20 m.) with a trunk sometimes 6 or 7 ft. (2 m.) in diameter, with light-gray bark having firm thick ridges, finally breaking off in fragments rather than scales. When growing alone it is a tree of low and very wide-spreading habit of growth, its sturdy limbs leaving the massive trunk at 10–12 ft. or less from the ground, and reaching out horizontally sometimes 40 or 50 ft. or more in all directions and shading an immense area. Such a tree festooned as it usually is with long locks of Spanish Moss, which here finds a most convenient resting place, is a beautiful and characteristic scene of the southern States, and one never to be forgotten by the lover of trees.

HABITAT.— The maritime region from southern Virginia to nearly the southern extremity of Florida, and westward to western Texas and into Mexico and Central America. In the western part of its range it is found at much higher altitudes than in the east, and of smaller stature or even shrubby.

PHYSICAL PROPERTIES.— Wood very heavy, hard, strong, tough, compact, close-grained and taking a beautiful polish, but difficult to work, with strong thick medullary rays and with principal ducts rather smaller and more distributed than in most of the oaks. It is of a light-brown color with lighter sap-wood. *Specific Gravity*, 0.9501; *Percentage of Ash*, 1.14; *Relative Approximate Fuel Value*, 0.9393; *Coefficient of Elasticity*, 113627; *Modulus of Rupture*, 1017; *Resistance to Longitudinal Pressure*, 547; *Resistance to Indentation*, 324; *Weight of a Cubic Foot in Pounds*, 59.21.

USES.— Formerly extensively used in ship-building for which it was more highly valued than any other oak. Of late it is still somewhat employed for the same purpose, but it has been largely replaced by other material.

MEDICINAL PROPERTIES, owing to the astringency of the bark, though not specifically reported, are probably those common to most of the oaks.

118. QUERCUS AQUATICA, WALT.

WATER OAK, DUCK OAK, POSSUM OAK, PUNK OAK.

Gen., *Wasser-Eiche;* Fr., *Chêne aquatique;* Sp., *Roble acuatico.*

SPECIFIC CHARACTERS.— *Leaves* thickish, glabrous and shining, green both sides, mostly deciduous, obovate-spatulate, entire, and more or less obscurely and irregularly 3-5-sinuate-lobed with rounded apex and lobes, but sometimes, especially on young shoots with more pointed and even mucronate lobes and apex, generally narrowing to a very short petiole. *Flowers* with mostly 4-6 stamens, styles long and spreading and abortive ovules near the top of the perfect seed. *Fruit* a small, subsessile acorn ½ in. or less in length, maturing the second year, with subglobose and often shortened nut tomentose within, and about ⅓ immersed in the very shallow, saucer-shaped cup, composed of many thin and pointed scales.

A handsome tree of medium-size and with full rounded top, under the most favorable conditions attaining the height of 80 feet (24 m.) with a trunk 3 or 4 ft. (1 m.) in diameter, clothed in a smooth grayish-brown bark blotched with whitish and on large trunks only very slightly fissured with irregular longitudinal checks. Few oaks compare with this in smoothness of bark.

HABITAT.—From Delaware southward to about the latitude of Tampa Bay in Florida and westward to central Texas; in the Mississippi valley it ranges as far north as Kentucky and Missouri, growing mostly in wet soil along the banks of streams, bottom-lands and swamps.

Physical Properties.—Wood heavy, hard, strong, compact, rather coarse-grained, medullary rays not numerous and of rather small size, annual rings marked by large open ducts; of a light mottled pinkish-brown color with lighter sap-wood. *Specific Gravity*, 0.2744; *Percentage of Ash*, 0.51; *Relative Approximate Fuel Value*, 0.7207; *Coefficient of Elasticity*, 122657; *Modulus of Rupture*, 1052; *Resistance to Longitudinal Pressure*, 501; *Resistance to Indentation*, 198; *Weight of a Cubic Foot in Pounds*, 45.14.

Uses.—Wood used for fuel and doubtless to some extent for furniture, interior finishing, etc., though not considered as valuable a wood as that of some of the other oaks.

Medicinal Properties are not claimed of this species, though like the other oaks it possesses astringent bark.

GYMNOSPERMÆ.

Flowering, exogenous plant with *leaves* chiefly parallel-veined and cotyledons frequently more than two. *Flowers* diclinous and very incomplete: pistil represented by an open scale or leaf, or altogether wanting, with ovules naked, fertilized by direct contact with the pollen, and seeds at maturity naked—without a true pericarp.

Order **CONIFERÆ**, Pine Family.

Leaves mostly awl-shaped or needle-shaped, evergreen, entire and parallel-veined. *Flowers* monœcious, or rarely dicœcious, in catkins or cones, destitute of both calyx and corolla; stamens one or several (usually united); ovary, style and stigma wanting; ovules one or several at the base of a scale, which serves as a carpel, or on an open disk. *Fruit* a cone, woody and with distinct scales, or somewhat berry-like, and with fleshy coherent scales, seeds orthotopous, embryo in the axis of the albumen.

Trees or shrubs with a resinous juice.

Genus **TAXODIUM**, Richard.

Leaves alternate, linear, sessile, slender, arranged in delicate flat 2-ranked sprays, light green, deciduous, as also a part of the slender branchlets; leaf-buds not scaly. *Flowers* monœcious, the *sterile* in terminal panicled spikes; stamens few with scale-like shield-shaped filaments bearing 2-5 anther cells; *fertile* flowers in small, ovoid, scaly catkins, the scales bractless and with a pair of ovules at the base of each scale. *Fruit* a globular closed cone, about 1 in. or less in diameter, composed of the spirally arranged scales which are now woody, much thickened, angular and somewhat shield-shaped, with two-angled seeds at the base of each scale.

(Name derived from the Greek ταξος, *a yew*, and εἶδος, *resemblance*.)

119. TAXODIUM DISTICHUM, Richard.

Bald Cypress, Black Cypress, Red Cypress, White Cypress.

Ger., *Zweizeliche Eibencypresse*; Fr., *Cypres afeuille*; Sp., *Cipres deshojado*.

Specific Characters are incorporated in the above generic description.

(The specific name *distichum*, is from the Greek δίς, *twice* or *double* and στίχος, *rank*, referring to the 2-ranked arrangement of the leaves.)

A large tree sometimes attaining the hight of 150 ft. (46 m.) with a trunk 10 or 12 ft. (3 m.) in diameter, with fibrous brownish bark marked

with prominent longitudinal ridges, which peel off in strips. It is a tree with rather wide-spreading top, when growing by itself, with light airy foliage and trunk very wide at base and reinforced with strong buttresses, an evident necessity to give the tree stability in the soft wet soil in which it grows.

Another interesting peculiarity of the tree is its habit of sending up from its large roots, when growing in very soft ground, conical or steeple-shaped projections, known as "cypress knees," varying from a few inches to 3 or 4 ft. in hight above the surface of the ground. They are hollow, excepting the smallest, covered with a smoothish bark like that of the roots, destitute of branches and foliage, and their function or use to the tree has never been satisfactorily explained. Perhaps they aid the tree in securing a firmer footing in the loose soil in which it grows.

HABITAT.—From southern Delaware southward along the coast nearly to the southern extremity of Florida, and westward through the Gulf States to central Texas, up the Mississippi valley to southern Illinois and Indiana, growing along the inundated bottom lands which border many of the southern streams, swamps and ponds of the Pine barrens. In such localities, unfit for almost every other use the bald Cypress flourishes in sometimes very extensive forests, and where it is likely to hold undisputed sway in years to come.

PHYSICAL PROPERTIES.—Wood light, soft and of medium strength, easily worked, close-grained, compact, very durable in contact with the soil, medullary rays thin and numerous; of a light or dark brown color, with brownish-white sap-wood. *Specific Gravity*, 0.4543; *Percentage of Ash*, 0.42; *Relative Approximate Fuel Value*, 0.4524; *Coefficient of Elasticity*, 103206; *Modulus of Rupture*, 682; *Resistance to Longitudinal Pressure*, 423; *Resistance to Indentation*, 81; *Weight of a Cubic Foot in Pounds*, 28.31.

USES.—One of the most valuable trees of its range, being extensively manufactured into lumber for general construction purposes, coopering, fencing, railway ties, etc.

MEDICINAL PROPERTIES are not claimed of this species.

NOTE.—The lumbermen of the Cypress regions recognize two kinds of Cypress lumber, as "Black" and "White," the former being of a darker brown color, harder and more durable than the latter. The difference seems to be solely in the wood itself and doubtless occasioned by the conditions of environment during growth, as botanists can find no distinction in other characters.

GENUS TORREYA, ARNOTT.*

Leaves evergreen, linear to linear-subulate, subsessile, convex and lustrous dark-green above, concave, paler, and marked with two conspicuous parallel grooves run-

* *Tumion*, Rafenesque.

ning the length of the leaf beneath, in flat 2-ranked sprays, rigid and sharply bristle-pointed. *Flowers* dicœcious, axillary, the *sterile* many together, in short oblong aments, with bracts at the base, imbricated in 4 rows; stamens in the form of peltate, pedicilate scales, bearing each 4 anther-cells at base; *fertile* aments ovoid, 1-flowered, with solitary naked ovule surrounded with imbricated persistent bracts. *Fruit* quite resembling a plum in appearance, sessile, glaucous, with fibro-fleshy testa, which dries down to a thin wrinkled covering after falling, and hard smooth nut-like inner coat, and embryo at the apex of a large ruminated albumen.

Genus represented by trees of few species and named in compliment to the eminent botanist, Dr. John Torry.

120. TORREYA TAXIFOLIA, Arn.

Yew-Leaved Torreya, Stinking Cedar, Savin.

Ger., *Stink-Ceder;* Fr., *Torreya à feuilles d'If;* Sp., *Cedro fetido.*

Specific Characters.—*Leaves* about 1 in. in length, mostly linear-sululate; widest at the base and gradually tapering to a mucronate tip. *Flowers* with yellow, crowded sterile aments. *Fruit* about 1 in. or slightly more in length when fresh (scarcely an inch when dry), with globose oblong, obtusely pointed and more or less compressed nut.

(The specific name, *taxifolia*, is from *taxus, yew*, and *folium, leaf*, alluding to a resemblance in the leaf of this tree to those of the Yew.)

A handsome tree of rather wide pyramidal habit of growth, occasionally attaining the hight of 50 or 60 ft. (18 m.), with a trunk rarely 2 or 2½ ft. (0.75 m.) in diameter, with thin brown bark checking longitudinally in thin scaly ridges. The odor of the crushed leaves is strong and very much resembles that of the tomato vine.

Habitat.—A very rare and local tree, being found only in Florida along the Apalachicola River between Chattahoochee and Bristol, and there, all but a small group of trees, on the eastern bank. It grows along the slopes of that stream or of its tributaries nearby, in rich, moist but well drained soil. It is found in such limited numbers that its extermination is greatly to be feared, and the tree, as it were conscious of that danger, seems wonderfully persistent of life. Indeed we have seen few if any trees its equal in that respect. The trunks and stumps of trees prostrated by the wind send up branches which eventually become tree trunks themselves, roots being sent down from the opposite side, if in contact with the soil and affording them support. Then quite commonly in the vicinity of the fruit-bearing trees may be seen seedlings in all stages of growth, from a few inches to a few feet in hight. Nature is certainly doing her part there in good earnest to perpetuate the species.

Physical Properties.— Wood light, soft, strong, compact, very close-grained, susceptible of a beautiful polish, easily worked and very durable in contact with the soil. It is of a clear brownish-yellow color

with thin whitish sap-wood and of a strong characteristic and somewhat terebinthinate odor. *Specific Gravity*, 0.5145; *Percentage of Ash*, 0.73; *Relative Approximate Fuel Value*, 0.5107; *Coefficient of Elasticity*, 82833; *Modulus of Rupture*, 887; *Resistance to Longitudinal Pressure*, 460; *Resistance to Indentation*, 158; *Weight of a Cubic Foot in Pounds*, 32.06.

USES.—Very valuable for fences, etc., owing to its great lasting qualities, and for which most of the best trees in the vicinity of Chattahoochee have been cut down.

MEDICINAL PROPERTIES are not known of this tree.

GENUS PINUS, TOURNEFORT.

Leaves evergreen, needle-shaped, from slender buds, in clusters of 2-5 together, each cluster invested at its base with a sheath of thin, membranous scales. *Flowers* appearing in spring, monoecious. *Sterile flowers* in catkins, clustered at the base of the shoots of the season; stamens numerous with very short filaments and a scale-like connective; anther-cells, 2, opening lengthwise; pollen grains triple. *Fertile flowers* in conical or cylindrical spikes, consisting of imbricated, carpellary scales, each in the axil of a persistent bract and bearing at its base within a pair of inverted ovules. *Fruit* maturing in the autumn of the second year, a cone formed of the imbricated carpellary scales, which are woody, often thickened or awned at the apex, persistent, when ripe dry and spreading to liberate the two nut-like and usually winged seeds; cotyledons 3-12 linear

(*Pinus* is a Latin word from Celtic *pin* or *pen*, *a crag*.)

121. PINUS SEROTINA, MICHX.

POND PINE.

Ger., *Teich-Fichte;* Fr., *Pin d'Etang;* Sp., *Pino pantanoso.*

SPECIFIC CHARACTERS.— *Leaves* three together, 5–8 in. in length, somewhat crowded, from a dark sheath about ⅓ in. in length. *Fruit* very short-pedunculate or often sessile, lateral, ovoid-pyramidal cones, when closed, 2–3 in. in length (about as broad as long when expanded), brown or grayish, often in pairs or clusters, scales rounded and thickened at the extremity and furnished with a very small, weak prickle.

(The specific name, *serotina* is a Latin adjective meaning *late* or *backward*, and refers to the lateness of the tree in shedding its cones.)

A tree occasionally attaining the height of 80 ft. (24 m.) and 30 in. (0.90 m.) in diameter of trunk as its maximum dimensions. It is a tree with wide-spreading, lofty top, with remote, rough, scaly branches, bearing close along their sides many scattering or clustered cones which remain on the tree, and some even retain their seeds, for six or seven years or more after attaining maturity. The bark of trunk is of a grayish-brown color, checking with age into very wide irregular ridges or patches composed of many loose irregular friable scales.

HABITAT.— A rather uncommon tree found along the coast from North Carolina southward to about the latitude of Tampa, Florida, growing in moist soil along the borders of streams, swamps and ponds of the pine region.

PHYSICAL PROPERTIES.— Wood heavy, rather soft, not strong, compact, very resinous and of a brownish-orange color, with abundant yellowish-white sap-wood. *Specific Gravity*, 0.7944; *Percentage of Ash*, 0.17; *Relative Approximate Fuel Value*, 0.7928; *Coefficient of Elasticity*, 116957; *Modulus of Rupture*, 1164; *Resistance to Longitudinal Pressure*, 505; *Resistance to Indentation*, 296; *Weight of a Cubic Foot in Pounds*, 49.49.

USES.— The wood of this tree is considered of inferior quality and not much used; occasionally for lumber for general construction purposes.

MEDICINAL PROPERTIES.— Not recognized in medicine though its pitch posesses the properties common to the genus.

122. PINUS CLAUSA, VASEY.

SAND PINE, SCRUB PINE.

Ger., *Sand-Fichte;* Fr., *Pin de sablon;* Sp., *Pino de arena.*

SPECIFIC CHARACTERS.—*Leaves* 2–3 in. long, slender, arranged in pairs with short sheathes ¼ in. or slightly more in length. *Fruit* a narrow pyramidal cone 2–2½ in. in length and (when closed) broadest near the rounded base where it is ½ to 1 in. thick, nearly sessile, spreading or reflexed, often in pairs or in whorls of three upon the branchlets, scales rounded and thickened at the apex and armed with a long slender weak prickle which soon breaks off, however leaving only its prominent wide base. The cones when fully expanded are oblong-ovoid and slightly oblique.

(The specific name, *clausa*, is the Latin for *closed*, alluding to the long time the cones remain closed.)

This tree rarely attains the dimensions of 80 ft. (24 m.) in hight with a trunk 30 in. (0.75 m.) in diameter, invested in a brown bark, checked longitudinally into loose scaly ridges. Growing as it does near the sea and in localities exposed to the sea-winds it is often much distorted and of small stature.

HABITAT.— Florida along the Gulf coast from Pensacola to Charlotte Harbor, and along the coast a little distance near St. Augustine, growing on the very barren sand-dunes and ridges, soil which will hardly support any other tree.

PHYSICAL PROPERTIES.— Wood light, soft, not strong, easily worked with numerous resin-passages and close grain. It is of a brownish-orange color with abundant creamy white sap-wood. *Specific Gravity* 0.5576; *Percentage of Ash*, 0.31; *Relative Approximate Fuel Value*, 0.5559; *Coefficient of Elasticity*, 54295; *Modulus of Rupture*, 502; *Resistance to Longitudinal Pressure*, 377; *Resistance to Indentation*, 131; *Weight of a Cubic Foot in Pounds*, 34.75.

USES.— Wood generally considered valueless, but it certainly possesses properties which would recommend its use for lumber for general construction purposes, etc.

MEDICINAL PROPERTIES are not known of this species save those common to the genus, and mentioned of other species.

NOTE.— The retention of the cones of this tree is worthy of special notice. They attain maturity the second year, but remain on the tree and closed for a long time, many until the thickening branches begin to form new wood over them. Some are found further down towards the trunk half enveloped by the new wood, and a few persist until entirely grown over in the advancing development of the tree. The seeds of such cones cannot then be liberated until after the decay of the tree and the reason of nature's retaining these seeds so long after attaining maturity is an interesting problem.

123. PINUS GLABRA, WALT.

LOWLAND SPRUCE PINE, WHITE PINE, CEDAR PINE.

Ger., *Glatte-Fichte;* Fr., *Pin de Cedre;* Sp., *Pino liso.*

SPECIFIC CHARACTERS.— *Leaves* in twos, rather slender, 4–5 in. long, with short close sheath 1¼ in. or less in length, branchlets smooth and whitish. *Fruit*, ovid-cylindrical cones (ovoid when expanded) about 2 in. in length, solitary or in pairs (rarely in whorls of three), with scales thickened at the apex and armed with a very weak prickle, inclining strongly forward toward the apex of the cone.*

(The specific name *glabra*, is the Latin for *smooth* and is descriptive of the conspicuously smooth bark of branches and branchlets.)

This Pine attains the height, sometimes of 80 or 100 ft. (30 m.) and a trunk 3 or 4 ft. (1 m.) in diameter, with smooth bark of branches, and bark of trunk fissured into narrow firm ridges. The character of the bark throughout quite closely resembles that of the White Pine (*P. Strobus*) farther north, and in that differs from all of the other southern Pines.

HABITAT.—A rather rare and local tree, found near the coast from South Carolina to middle Florida and westward along the Gulf coast into Louisiana growing in the rich soil of low-lands.

PHYSICAL PROPERTIES.—Wood light, soft, not strong, not durable in contact with the soil, containing but little resin and easily worked; of a light pinkish-brown color and with abundant whiter sap-wood. *Specific Gravity*, 0.3931; *Percentage of Ash*, 0.45; *Relative Approximate Fuel Value*, 0.3913; *Coefficient of Elasticity*, 44750; *Modulus of Rupture*, 496; *Resistance to Longitudinal Pressure*, 288; *Resistance to Indentation*, 106; *Weight of a Cubic Foot in Pounds*, 24.50.

* This character, the inclination of the prickle to the axis of the cone, or the inner surface of the scale when the cone is expanded, I deem quite reliable in distinguishing the cone of this species from that of the *P. mitis*, which it otherwise closely resembles, and in which the prickle is more reflexed, so as to point at right angles or nearly so from the axis of the cone. The character is best shown in the young cones only partially developed and before the weak prickles have been broken.

USES.—Too uncommon a timber to be extensively used, though its properties would strongly commend it for the uses to which the northern White Pine is applied. Few if any of the southern pines as closely resemble the White Pine in working qualities as this.

MEDICINAL PROPERTIES are not claimed of this species.

124. PINUS PALUSTRIS, MILL.*

LONG-LEAVED PINE, HARD PINE, GEORGIA PINE, SOUTHERN PINE.

Ger., *Langnadelige Fichte;* Fr., *Pin de feuilles allonges;* Sp., *Pino con hojas largas.*

SPECIFIC CHARACTERS.—*Leaves* in 3s, very long, 8–15 in., with long ragged and fimbriated sheaths ¾–1 in. long, crowded at the ends of very rough, scaly, thick branchlets. *Staminate flowers* in rose-purple aments, 2–3 in. long. *Fruit,* large, cylindrical or conical-oblong terminal cones, 6–10 in. long, sessile or nearly so, with scales thickened at the extremity and armed with a short recurved spine.

(The specific name, *palustris,* is the Latin for *swampy,* and inappropriately applied to this tree as it is rarely found in swampy places.

A tree occasionally attaining the hight of 80 or 90 ft. (25 m.) with lofty wide top of few large branches, the foliage tufted at the ends of the branchlets, and trunk rarely over 3–3½ ft. (1 m.) in diameter, clothed in a grayish-brown bark, checked into large elongated patches the outer surfaces of which flake off in irregular friable scales.

HABITAT.—From southern Virginia southward along the coast to about the latitude of Tampa, Fla., and thence westward to Louisiana and Texas, growing in dry, sandy soil and occupying vast tracts known as the Pine Barrens, and of which this was originally almost the exclusive tree.

PHYSICAL PROPERTIES.—Wood hard, heavy, strong, tough, coarse-grained, compact, durable in contact with the soil and very resinous. It is of a pinkish-brown color with lighter sap-wood. *Specific Gravity,* 0.6999; *Percentage of Ash,* 0.25; *Relative Approximate Fuel Value,* 0.6982; *Coefficient of Elasticity,* 148733; *Modulus of Rupture,* 1152; *Resistance to Longitudinal Pressure,* 629; *Resistance to Indentation,* 153; *Weight of a Cubic Foot in Pounds,* 43.62.

USES.—A tree of greatest economic value, the wood being peculiarly appropriate for flooring, for which it is extensively employed, and is also largely used for ship-building and general construction purposes, for railway ties and occasionally "figured" trees, which are of rare ornamental value, for rich interior finishing, etc.

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* *Pinus australis,* Michx, in Chapman's *Flora of the Southern States.*

Nearly all of the turpentine, tar, pitch and resin used in the U. S., besides a large quantity annually exported, are products of this tree.

MEDICINAL PROPERTIES of this species exist mainly in the turpentine produced from it. They are stimulant, diuretic, occasionally diaphoretic and anthelmintic, and when applied externally rubefacient.*

125. PINUS CUBENSIS, GRISEB.

SLASH PINE, SWAMP PINE, BASTARD PINE, MEADOW PINE.

Ger., *Cubanische Fichte;* Fr., *Pin taillade;* Sp., *Pino recortado.*

SPECIFIC CHARACTERS.—*Leaves* in both 2s and 3s, 7-12 in. long, with long sheaths about ½ in. long, ragged and fimbriated at the margin; branchlets rough and scaly. *Staminate* aments purple, about 2 in. long; the *pistillate* aments terminal, pedunculate and usually two or more together. *Fruit* ovoid-cylindrical cones, recurved, 3-6 in. long, rich glossy brown as if varnished, scales thickened at the end and armed with a short, recurved spine.

(The specific name, *Cubensis*, is a Latinized word meaning Cuban, and alludes to the occurrence of this tree in Cuba, from whence it takes its name.)

This tree sometimes attains the hight of 80 or 100 ft. (30 m.), with a trunk 2 or 3 ft. (0.90 m.) in diameter, with reddish-brown bark of trunk, rough with loose, irregular, scaly, and not very broad ridges.

HABITAT.—From South Carolina southward near the coast to the southern extremity of Florida, also in the West Indies, and westward along the Gulf coast into Louisiana, in light sandy soil in the proximity of the coast and about the ponds of the Pine Barrens. It is springing up abundantly in regions from which forests of the Long leaved Pines have been cleared.

PHYSICAL PROPERTIES.—Wood, hard, heavy, strong, compact, tough. coarse-grained, very resinous, durable and with broad conspicuous bands of summer cells. It is of a light pinkish-brown color with abundant yellowish-white sap-wood. *Specific Gravity*, 0.7504; *Percentage of Ash*, 0.26; *Relative Approximate Fuel Value*, 0.7484; *Coefficient of Elasticity*, 157747; *Modulus of Rupture*, 1172; *Resistance to Longitudinal Pressure*, 664; *Resistance to Indentation*, 186; *Weight of a Cubic Foot in Pounds*, 46.76.

USES.—This pine though not as popular as the Long-leaved, nor much used where that can be found, is, nevertheless, but little inferior to it, and applicable to the same uses, as for lumber, for flooring and for general construction purposes, for railway ties, etc. Some turpentine and tar are also procured from this tree.

MEDICINAL PROPERTIES are the same as those mentioned of the Long-leaved Pine.

* *U. S. Dispensatory*, 16th ed. p. 1089-1090.

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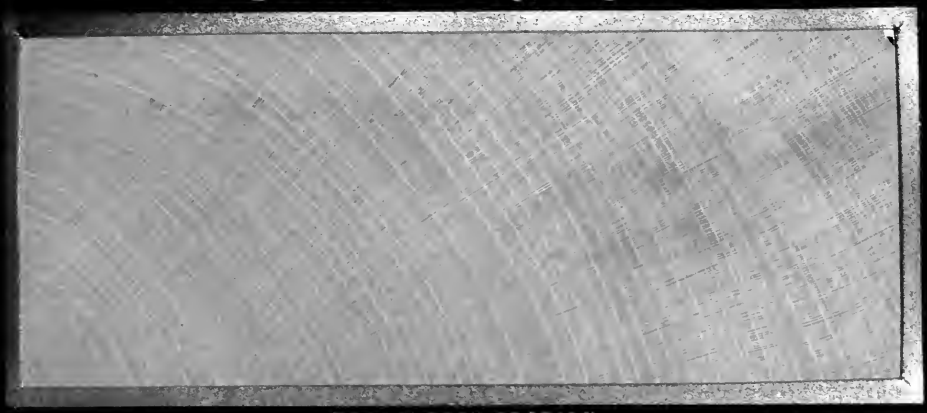
Big Laurel, Bull Bay, Magnolia.



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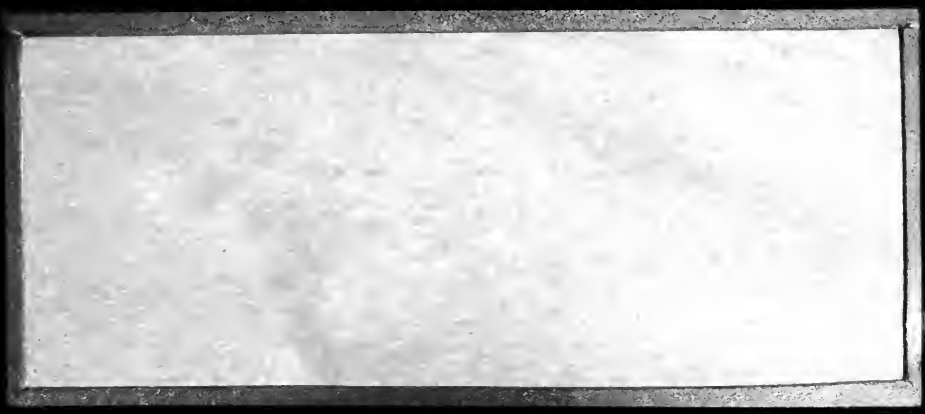


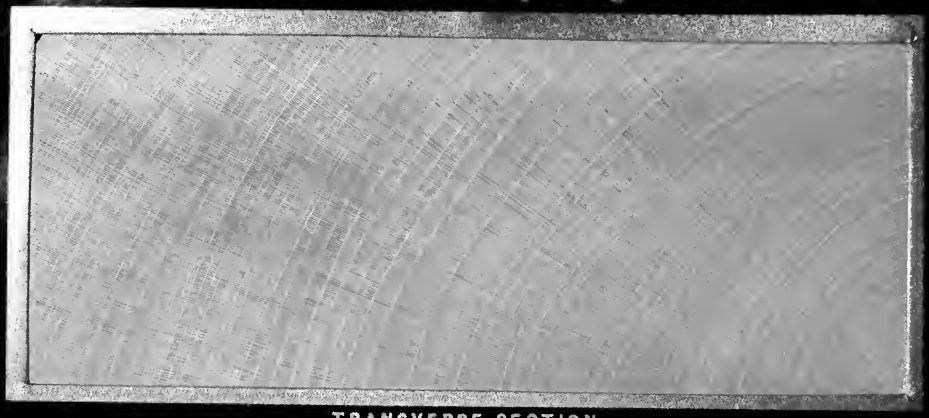
TANGENTIAL SECTION

Ger. Grossblumige Magnolia. Fr. Grand Magnolier.

Sp. Magnolia foregrande.

101. MAGNOLIA GRANDIFLORA, L.

Big Laurel, Bull Bay, Magnolia.



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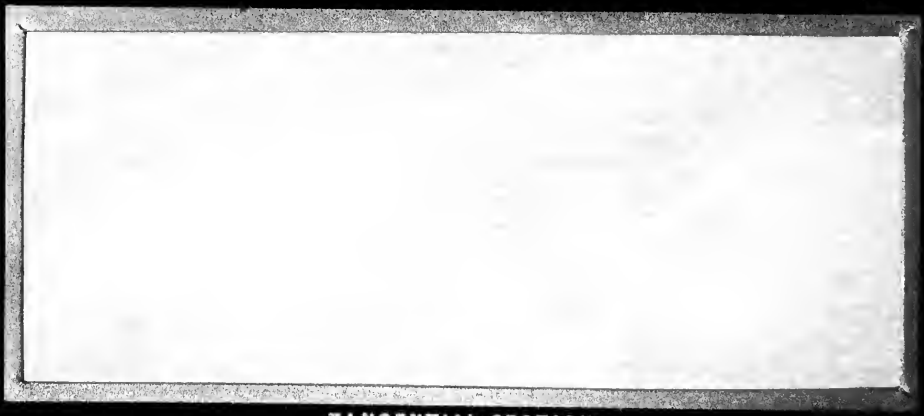


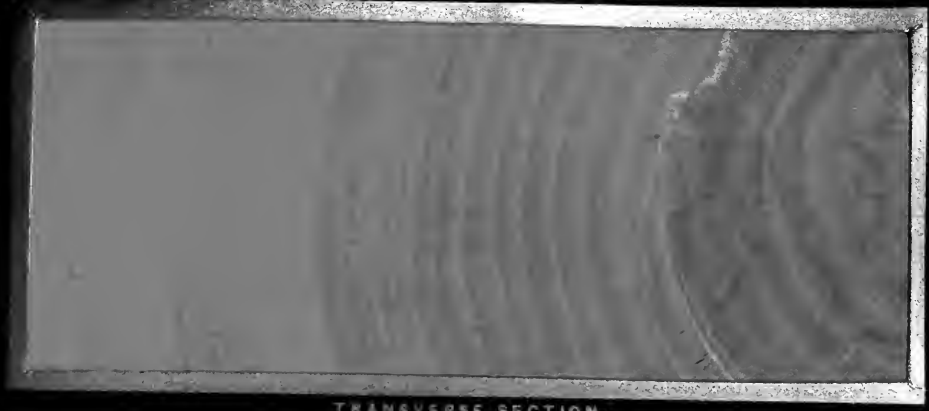
TANGENTIAL SECTION

Ger. Grossblumige Magnolia. Fr. Grand Magnolier

Sp. Magnolia floregrande.

102. GORDONIA LASIANTHUS, L.

Loblolly Bay, Tan Bay.



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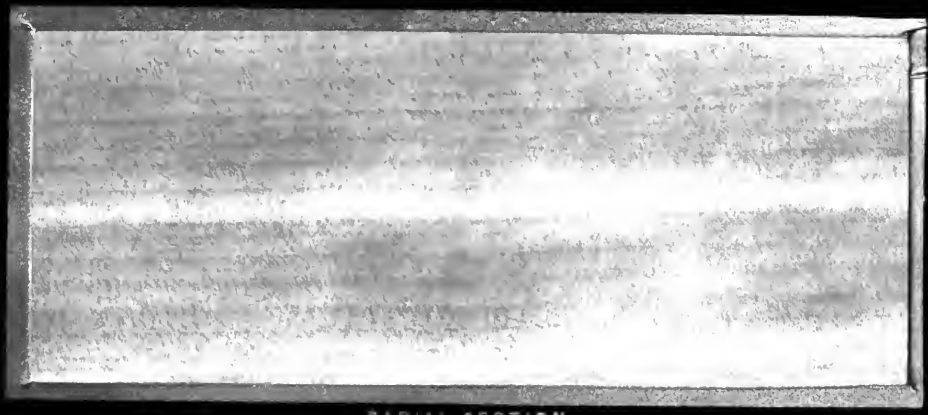

RADIAL SECTION.

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Ger. Langstielige Gordonie. Fr. Gordonia à feuilles glabres

Sp. Gordonia.

102. GORDONIA LASIANTHUS, L.

Loblolly Bay, Tan Bay.

TRANSVERSE SECTION.

RADIAL SECTION.

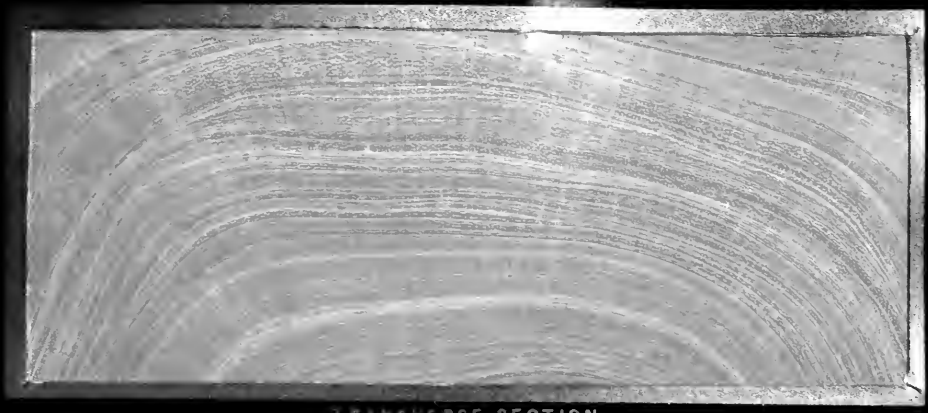
TANGENTIAL SECTION

Ger. Langstielige Gordonie. Fr. Gordonia à feuilles glabres

Sp. Gordonia.

103. CITRUS AURANTIUM, L.

Orange.



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Ger. Orangenbaum. Fr. Oranger. Sp. Naranjo.

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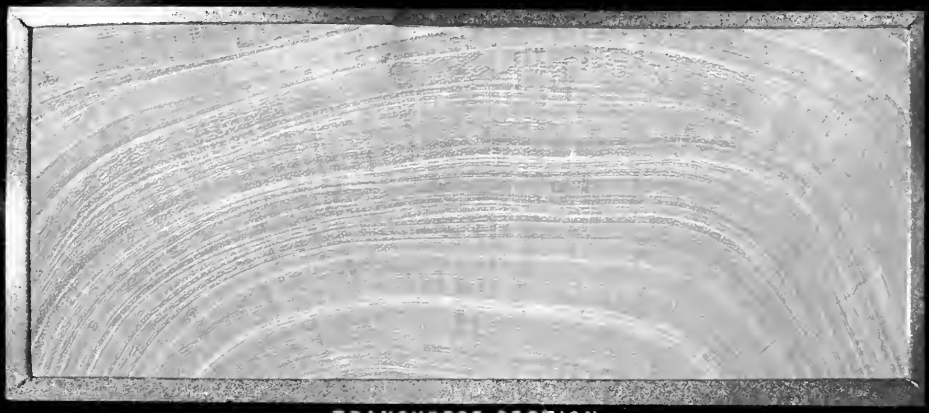

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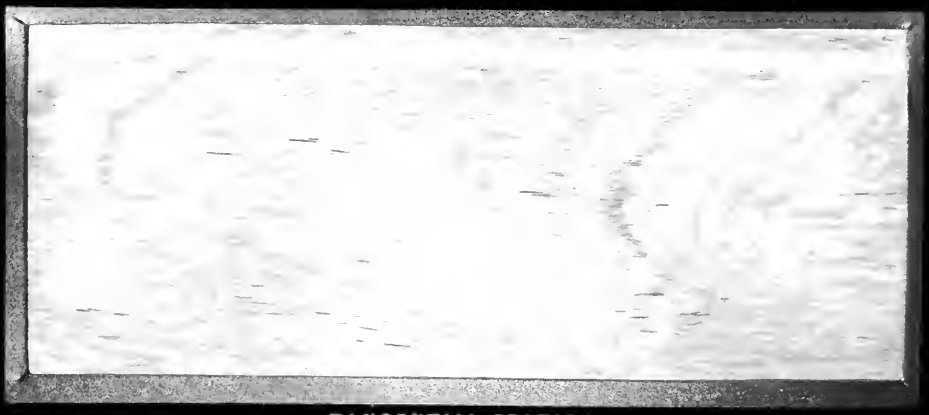

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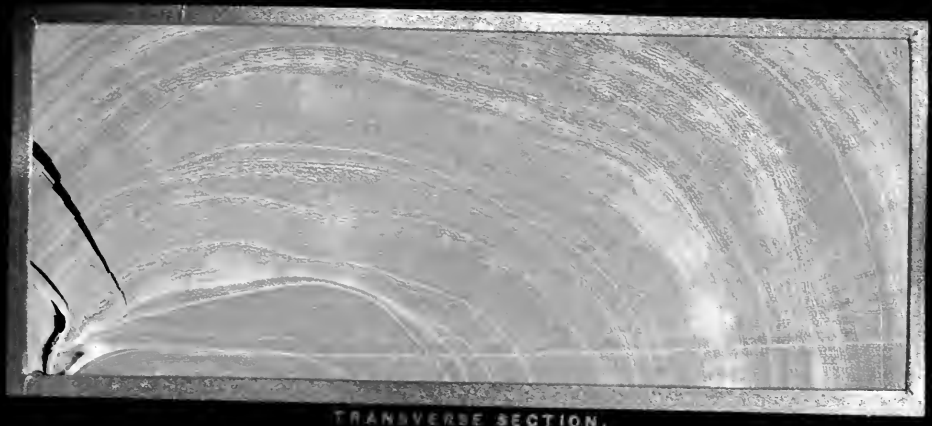
Ger. Orangenbaum. Fr. Oranger. Sp. Naranjo.

104. CITRUS LIMONUM, L.

Lemon.



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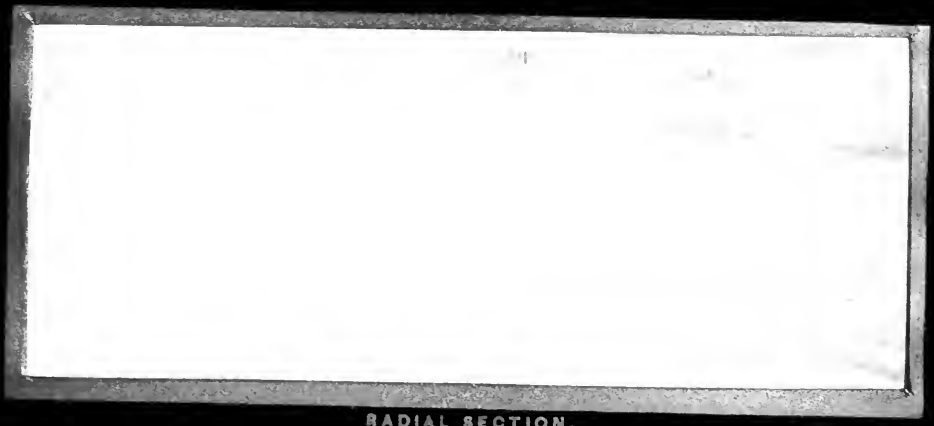

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Ger. Limonenbaum. Fr. Citronnier. Sp. Limon.

104. CITRUS LIMONUM, L.

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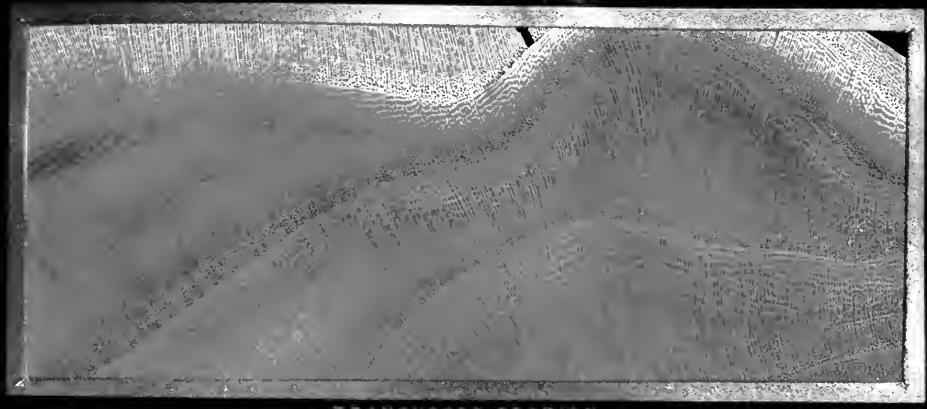
Ger. Limonenbaum. Fr. Citronnier. Sp. Limo.

105. MELIA AZEDARACH, L.

Pride of India, China-berry, China Tree, Bead Tree.



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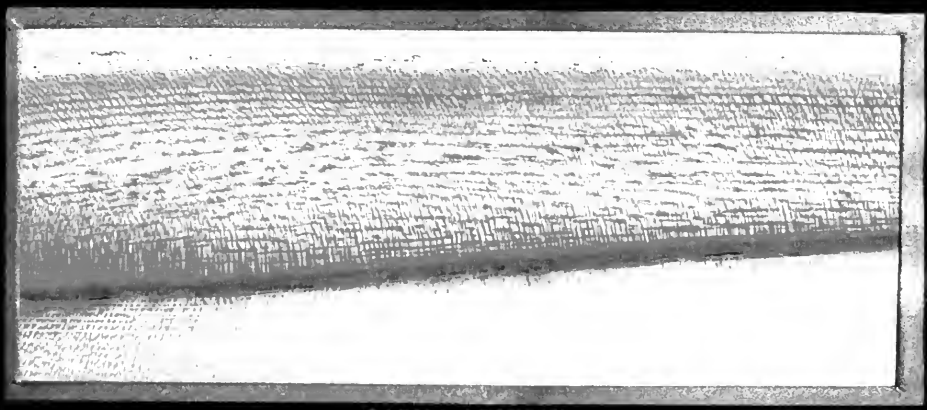

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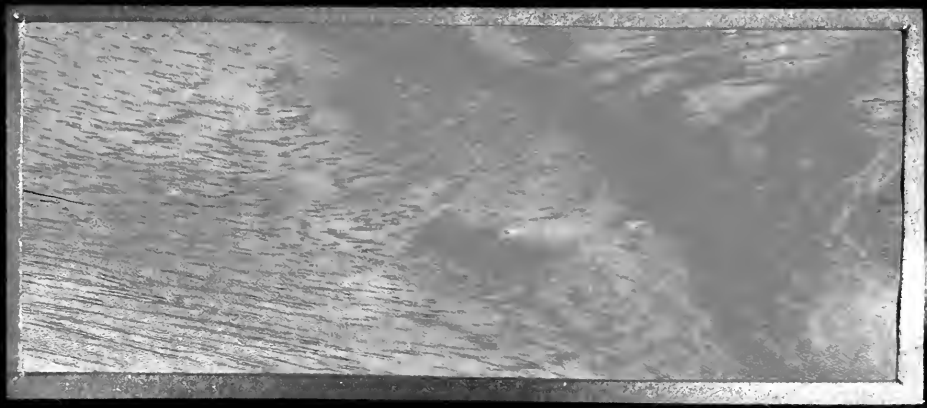

TANGENTIAL SECTION

Ger. Paternosterbaum. Fr. Azedarach. Sp. Cinamomo.

105. MELIA AZEDARACH, L.

Pride of India, China-berry, China Tree, Bead Tree.

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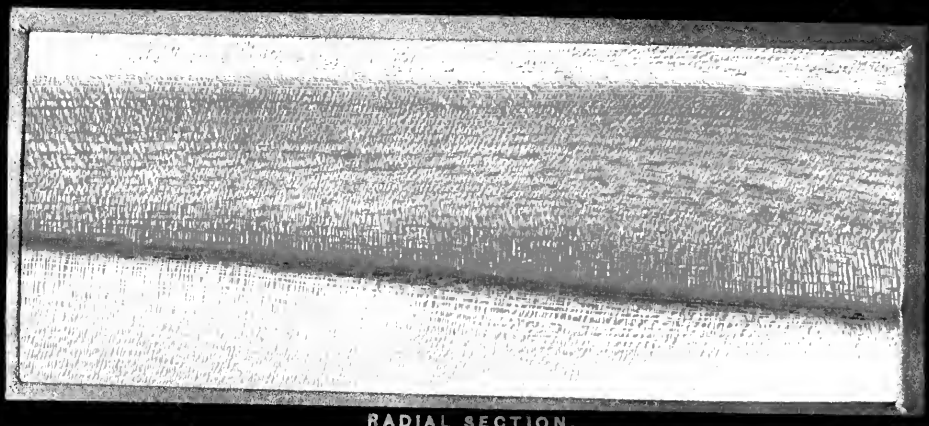

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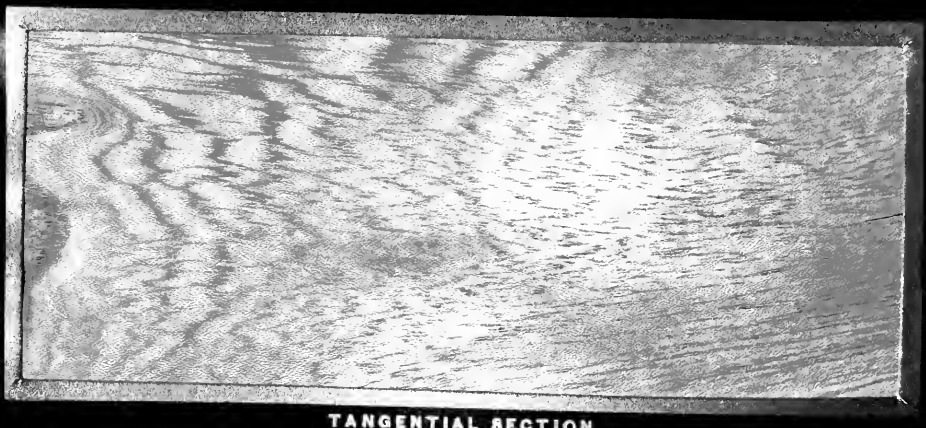

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Ger. Paternosterbaum. Fr. Azedarach. Sp. Cina

96 XANTHOXYLUM CLAVA-HERCULIS, L.

Prickly Ash, Sea Ash, Toothache Tree, Pepper-wood.

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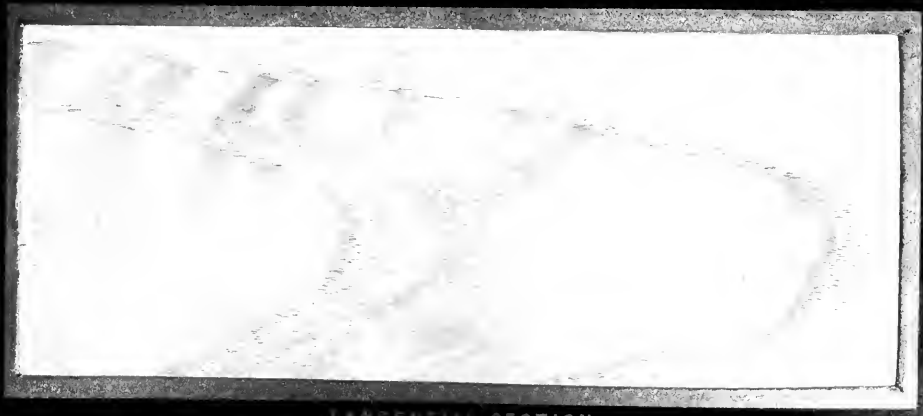

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Ger. Eschenblättriger Gelbholz. Fr. Frêne des épines.

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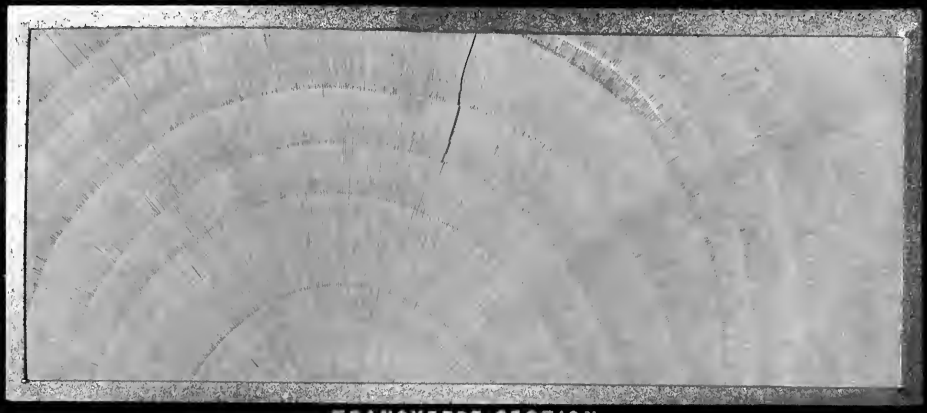
Prickly Ash, Sea Ash, Toothache Tree, Pepper-wood.



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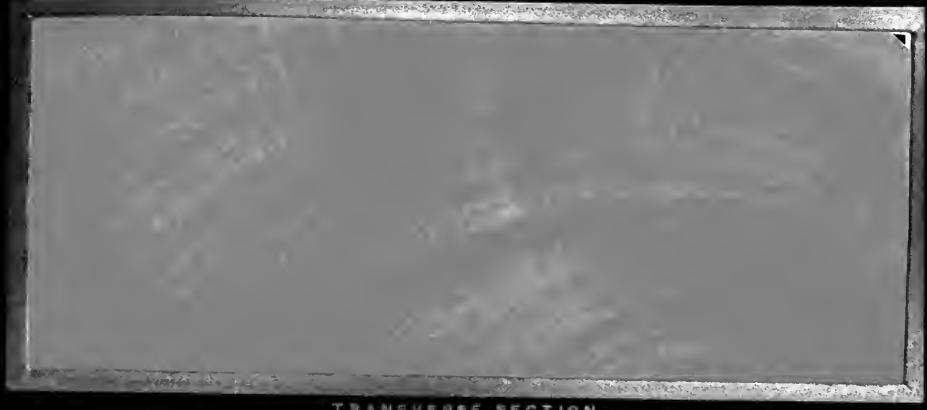
Ger. Eschenblättriger Gelbholz. *Fr.* Frêne des épines.

Sp. Jantoxaro.

107. CYRILLA RACEMIFLORA, L.

Red Titi. Leather-wood, Iron-wood.



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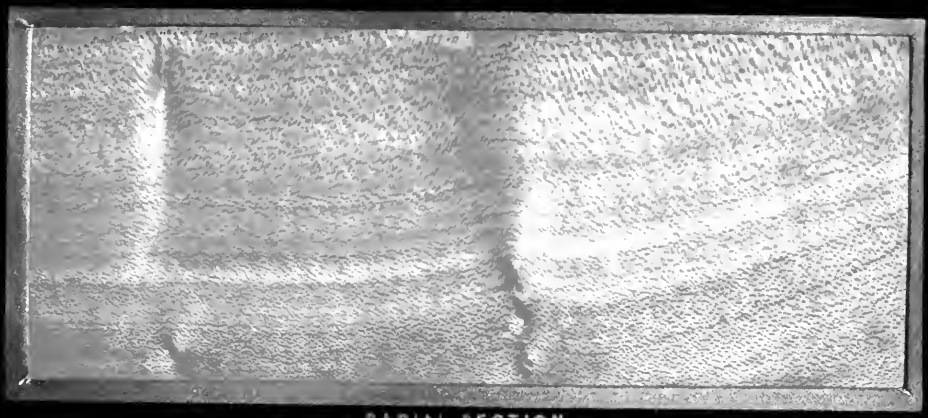

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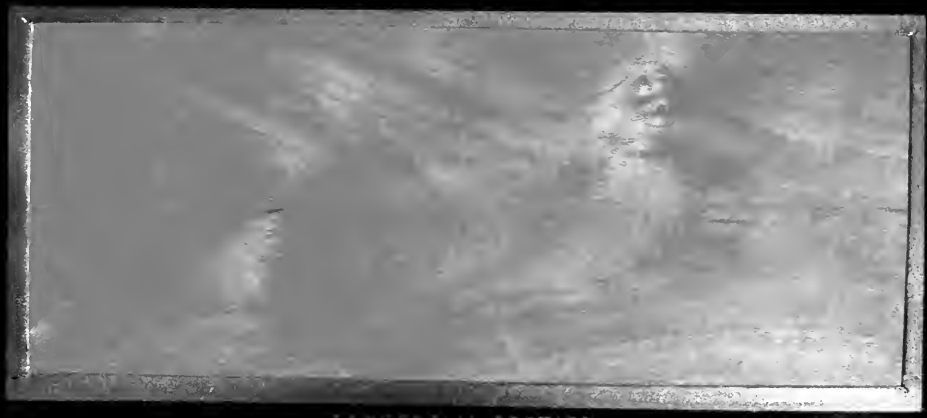


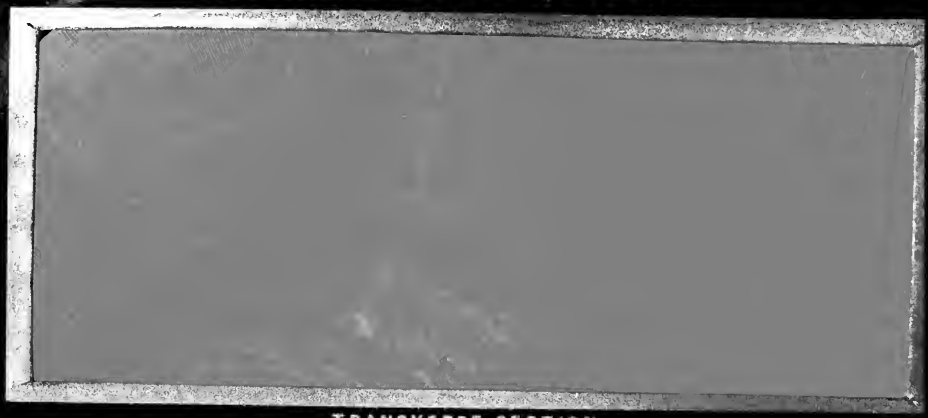
TANGENTIAL SECTION

Ger. Traubenblättrige Cyrille. Fr. Cyrille de Caroline.

Sp. Madera de hierro.

107. CYRILLA RACEMIFLORA, L.

Red Titi. Leather-wood, Iron-wood.



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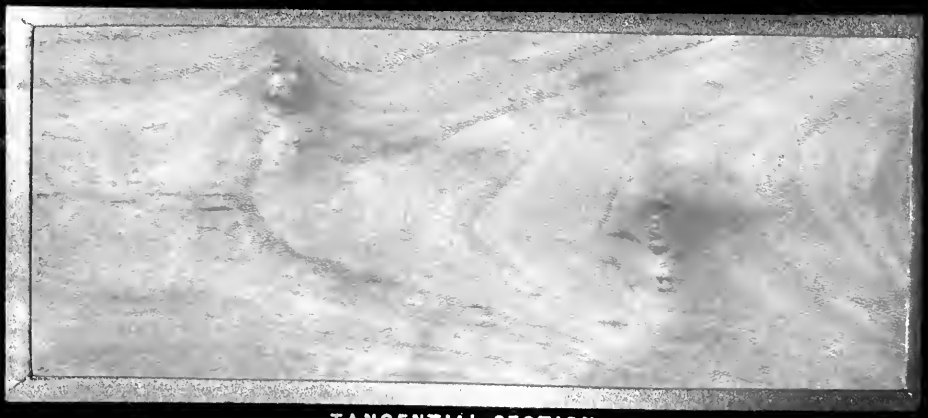


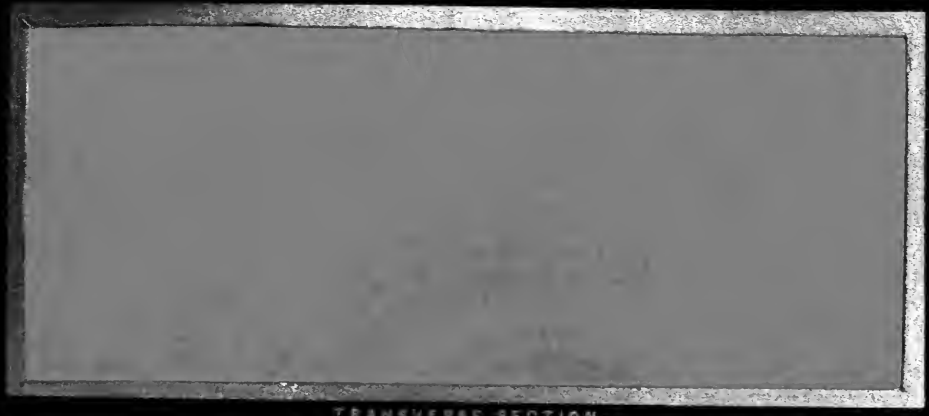
TANGENTIAL SECTION

Ger. Traubenblättrige Cyrille. Fr. Cyrille de Caroline.

Sp. Madera de hierro.

108. CLIFTONIA LIGUSTRINA, BANKS.

Titi, Buckwheat Tree.



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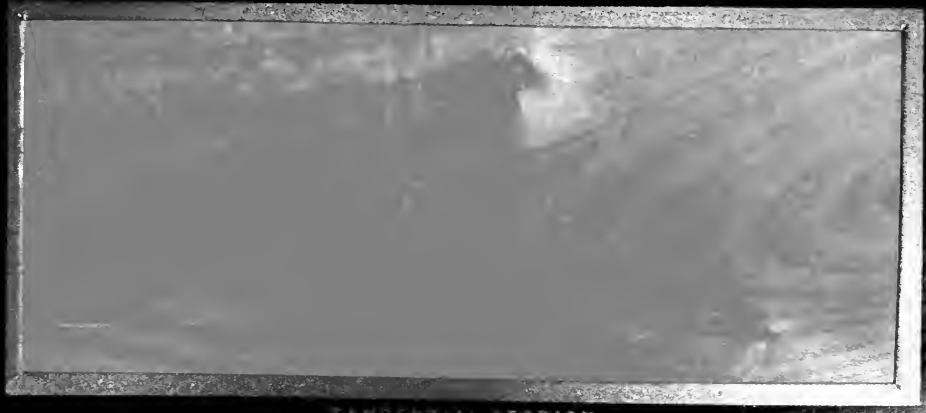
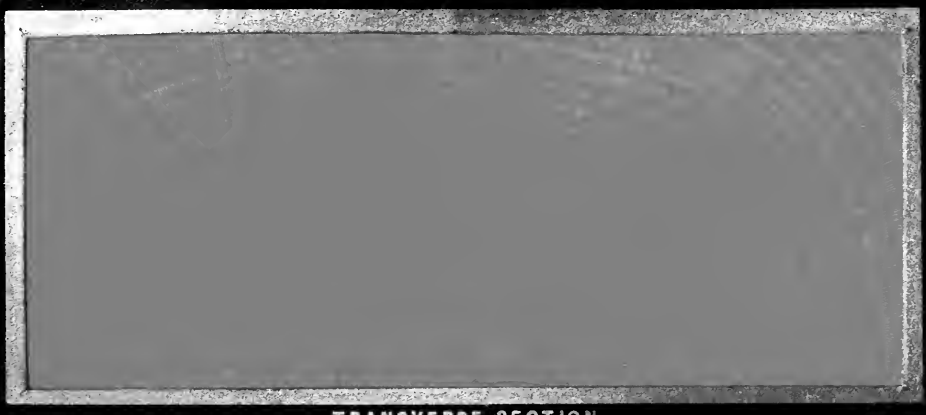


TANGENTIAL SECTION

Ger. Buchweizenbaum. Fr. Cliftonie à feuilles de Troene.

108. CLIFTONIA LIGUSTRINA, BANKS.

Titi, Buckwheat Tree.



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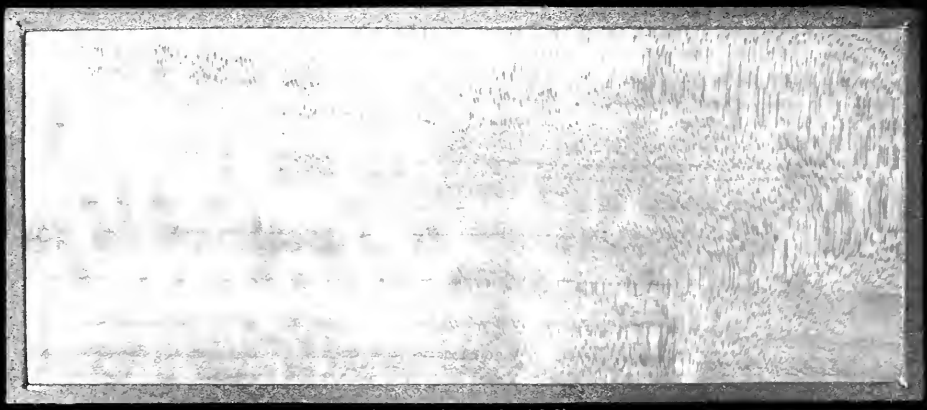

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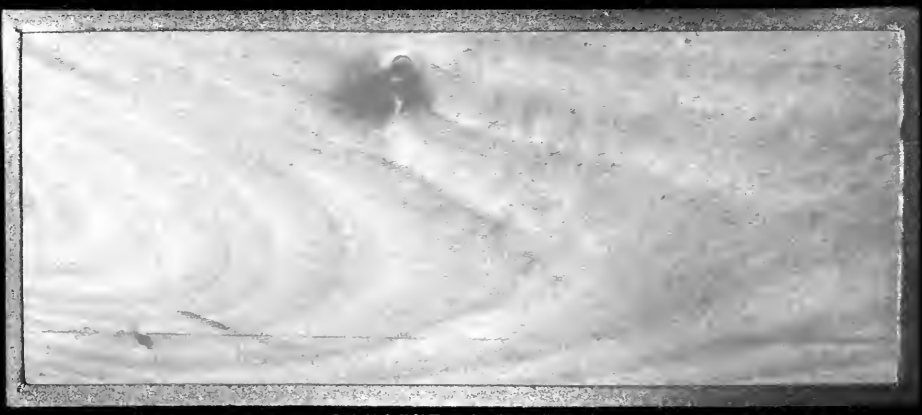
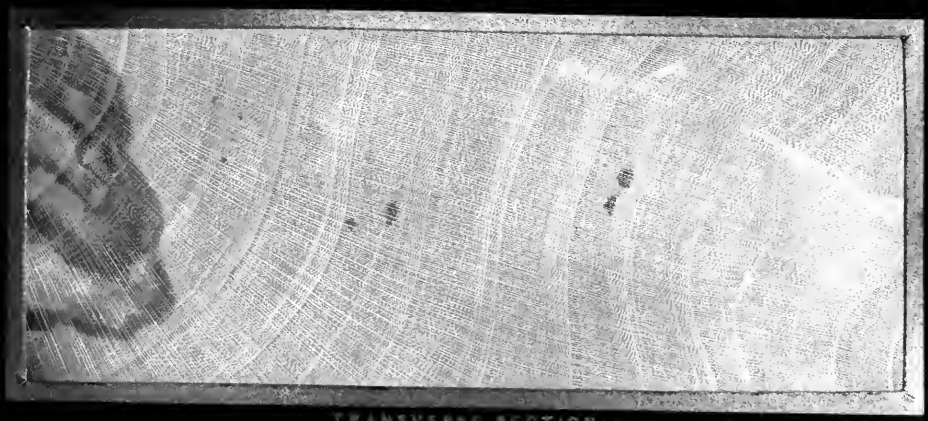


TANGENTIAL SECTION

Ger. Buchweizenbaum. *Fr.* Cliftonie à feuilles de Troène.

GLEDITSCHIA MONOSPERMA, WALT.

Water Locust.



TRANSVERSE SECTION.

RADIAL SECTION.

TANGENTIAL SECTION

Ger. Einsamiger Honigdorn. Fr. Fevier monosperme.

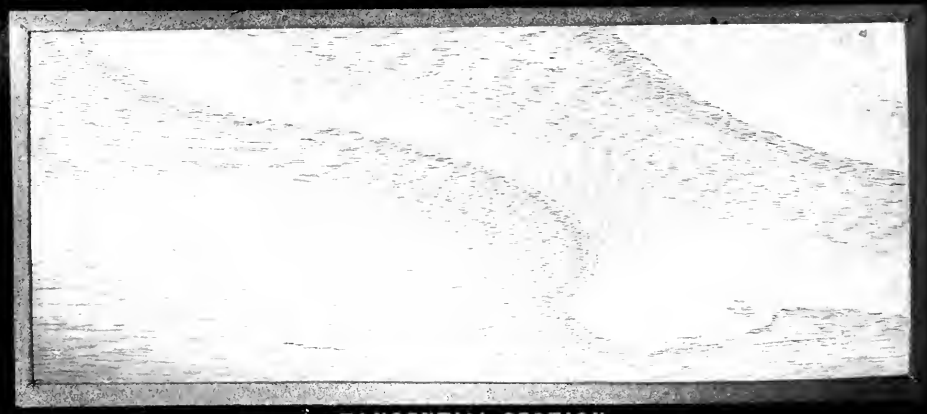
Sp. Algorrobo acuatico.

109. GLEDITSCHIA MONOSPERMA, WALT.

Water Locust.

TRANSVERSE SECTION.

RADIAL SECTION.



TANGENTIAL SECTION

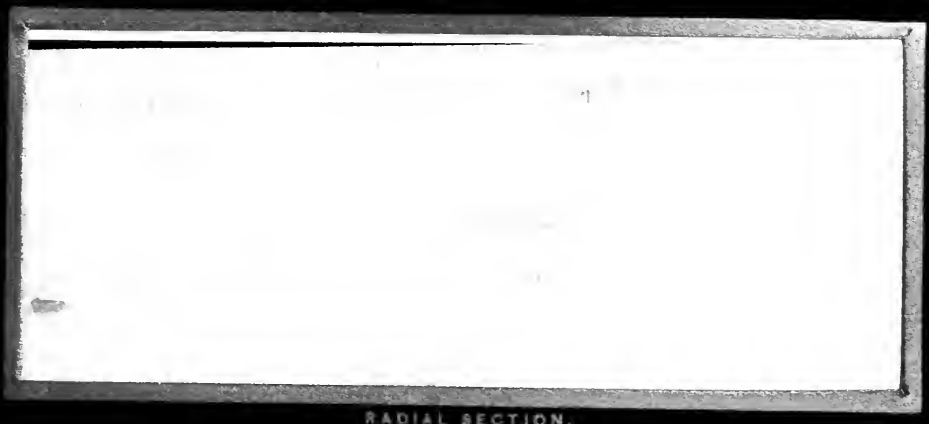
Ger. Einsamiger Honigdorn. Fr. Fevier monosperme

Sp. Algorrobo acuatico.

110. NYSSA OGECHE, MARSHALL.

Ogeechee Lime, Sour Tupelo, Gopher Plum.

TRANSVERSE SECTION.



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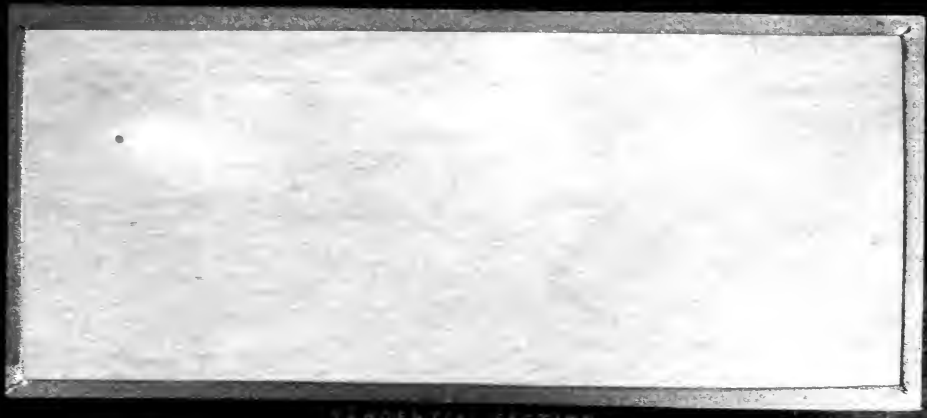


TANGENTIAL SECTION.

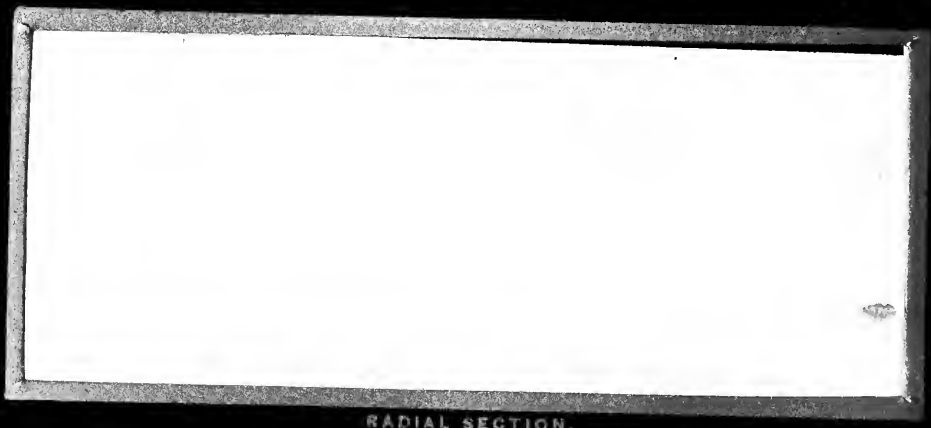
Ger. Weisslicher Tupelobaum. Fr. Tupelo blanchâtre.

Sp. Lima de Ogeechee.

110. NYSSA OGECHE, MARSHALL.

Ogeechee Lime, Sour Tupelo, Gopher Plum.

TRANSVERSE SECTION.



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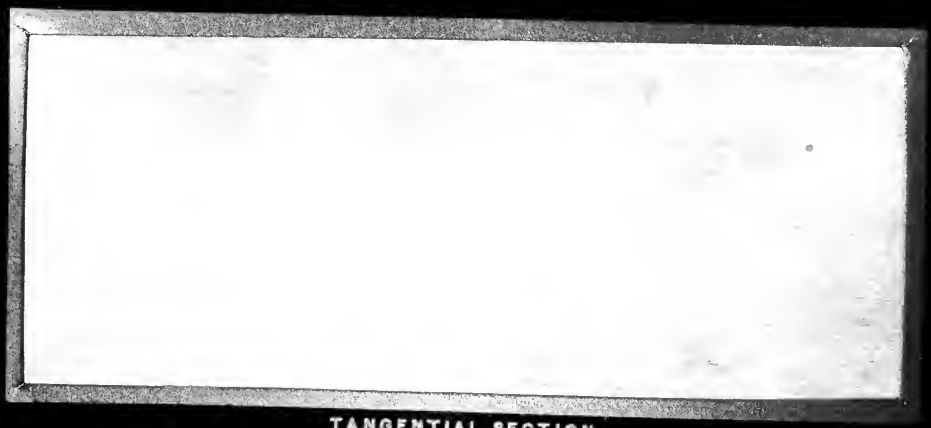


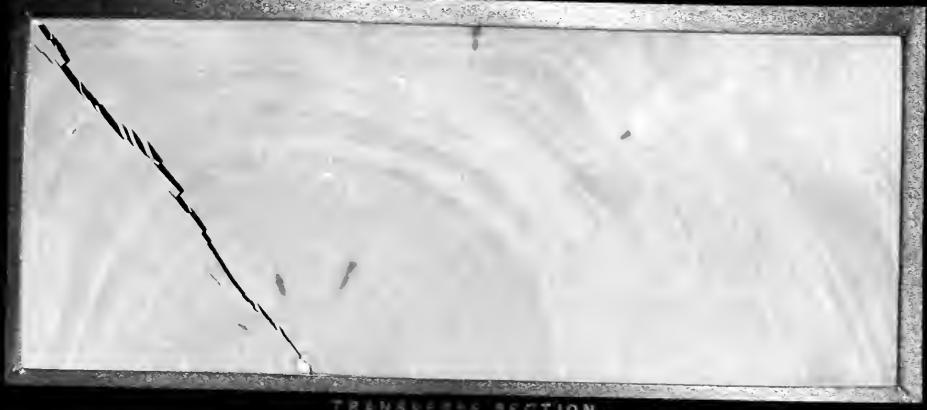
TANGENTIAL SECTION

Ger. Weisslicher Tupelobaum. Fr. Tupelo blanchâtre.

Sp. Lima de Ogeechee.

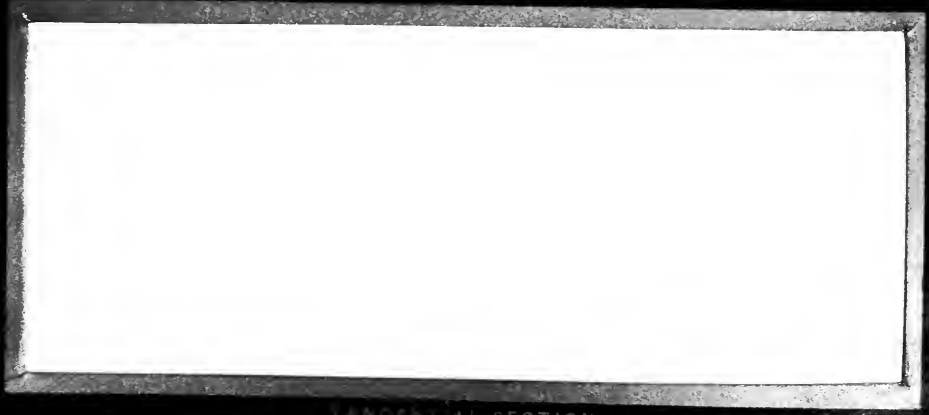
111 FORESTIERA ACUMINATA, POIR.

Swamp Privet.



TRANSVERSE SECTION.

RADIAL SECTION.



TANGENTIAL SECTION

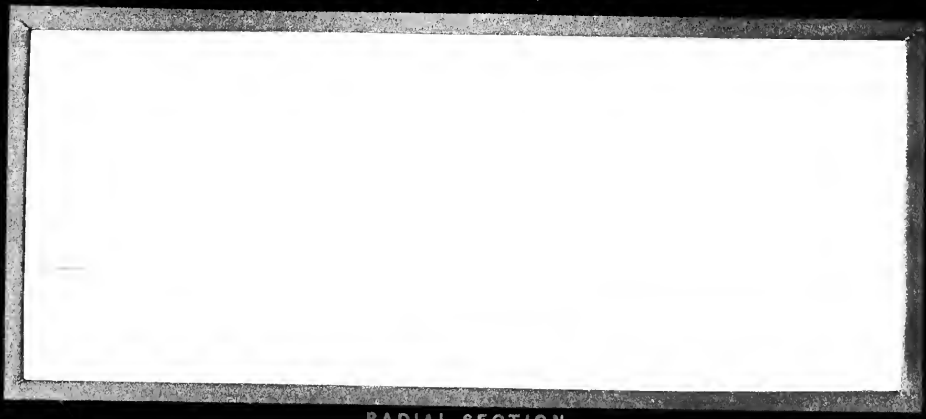
Ger. Sumpf-Bainweide. Fr. Troene marecageux.

Sp. Alheña pantanosa.

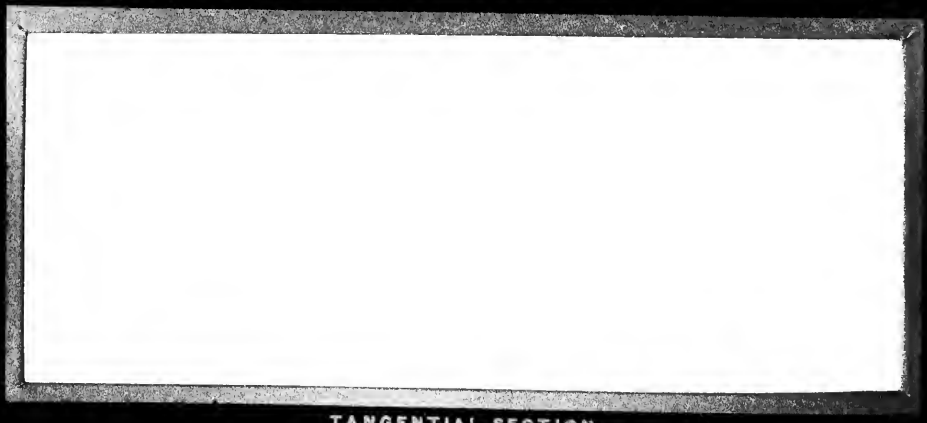
111. FORESTIERA ACUMINATA, Poir.

Swamp Privet.

TRANSVERSE SECTION.



RADIAL SECTION.



TANGENTIAL SECTION

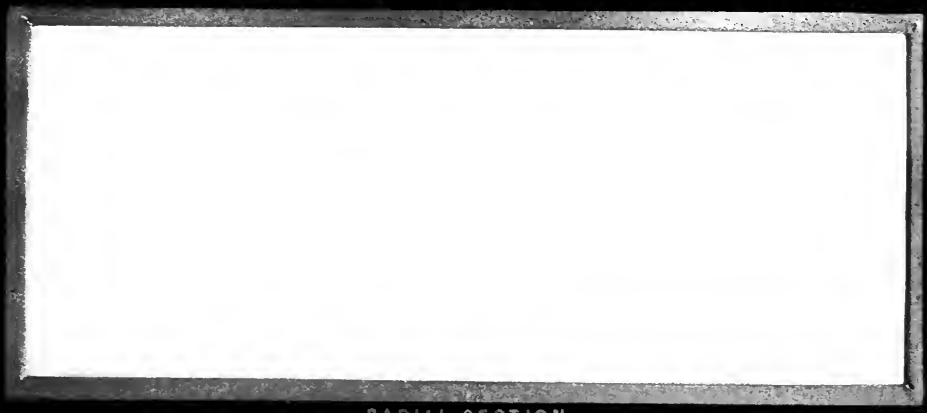
Ger. Sumpf-Rainweide. Fr. Troene marecageux.

Sp. Alheña pantanosa.

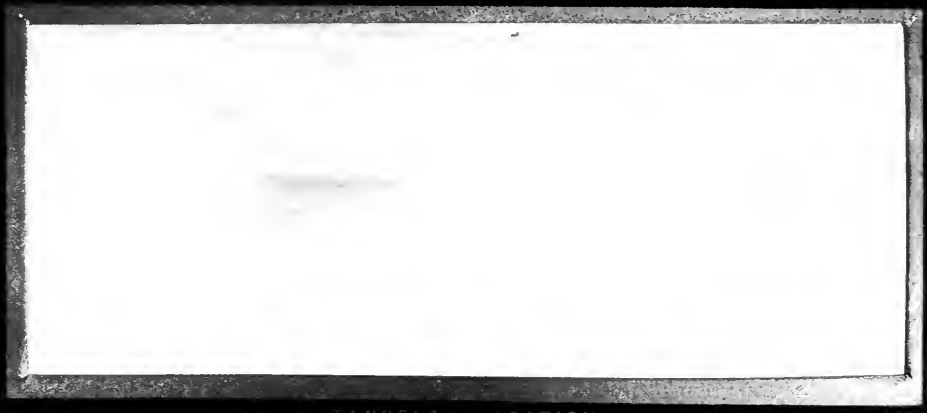
112 OSMANTHUS AMERICANUS, B. & H.

Devil-wood, Wild Olive.

TRANSVERSE SECTION.



RADIAL SECTION.



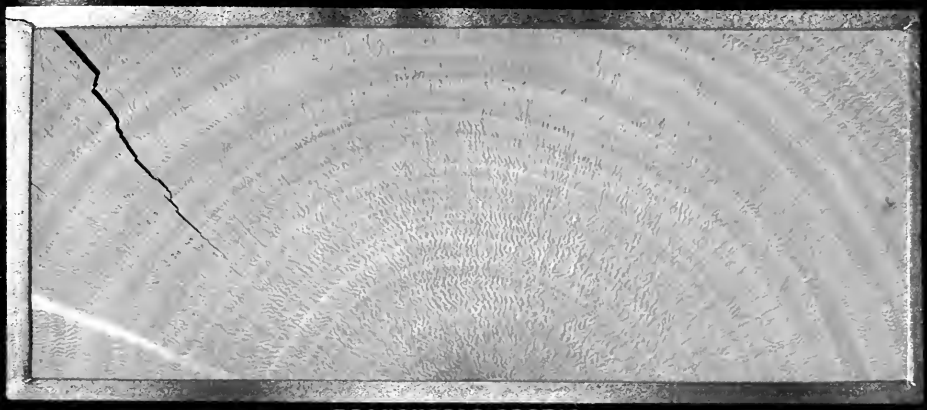
TANGENTIAL SECTION

Ger. Amerikanischer Oelbaum. Fr. Olivier d'Amerique.

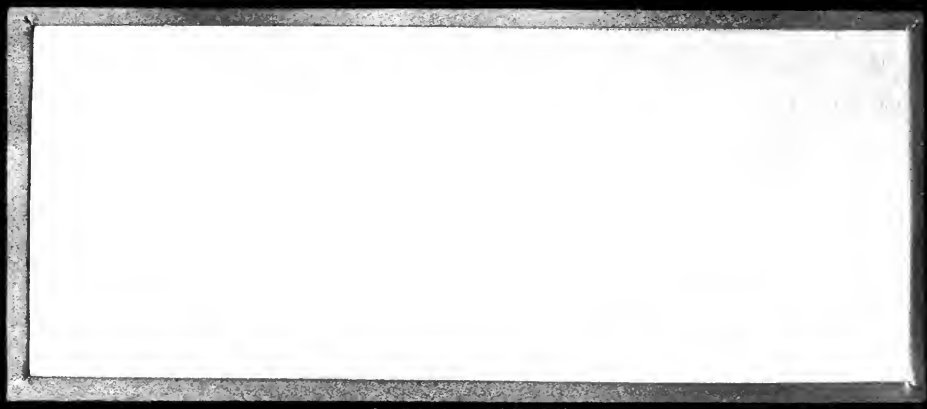
Sp. Madera del diablo.

112. OSMANTHUS AMERICANUS, B. & H.

Devil-wood, Wild Olive.



TRANSVERSE SECTION.



RADIAL SECTION.

TANGENTIAL SECTION

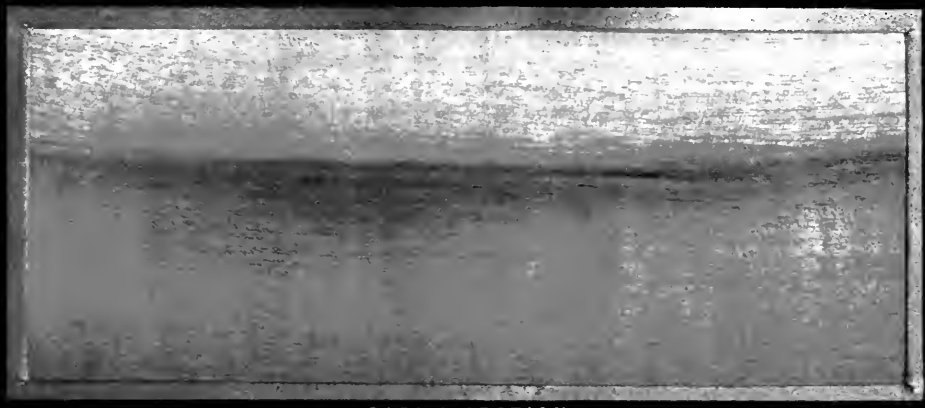
Ger. Amerikanischer Oehlbaum. Fr. Olivier d'Amer[illegible]

Sp. Madera del diablo.

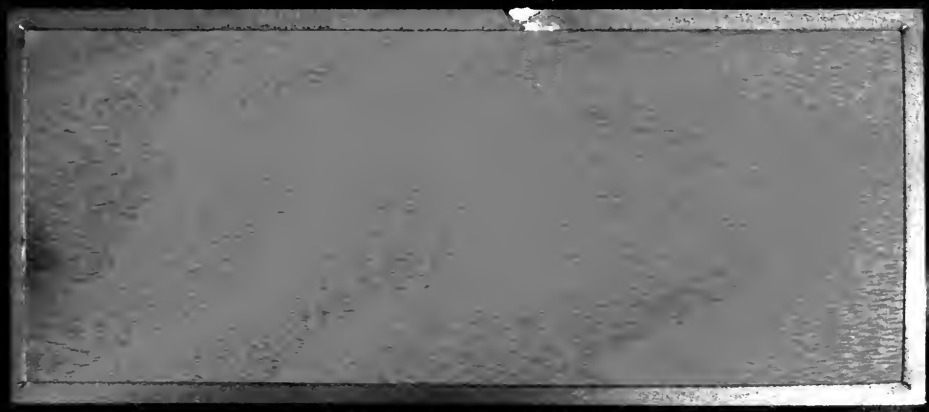
T. 3 PERSEA CAROLINENSIS, NEES. VAR. PAL.CH.

Swamp Red Bay.

TRANSVERSE SECTION.



RADIAL SECTION.



TANGENTIAL SECTION

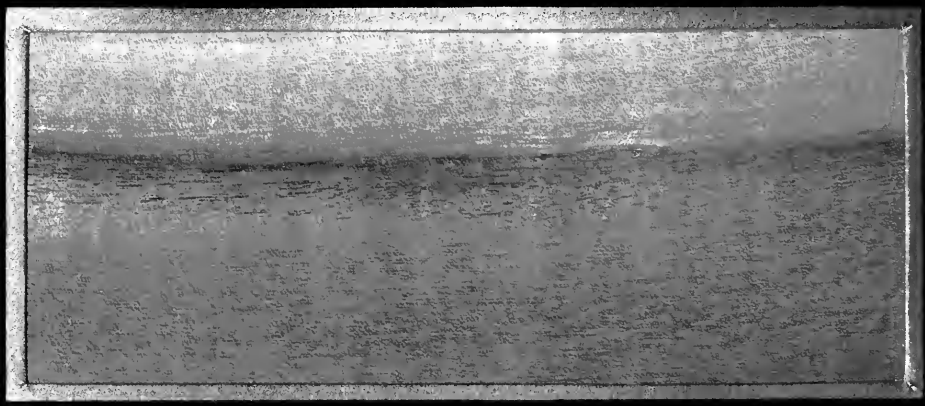
Ge: Rother Lorbeerbaum. F: Persea de Carolina.

Sp Laurel colorado.

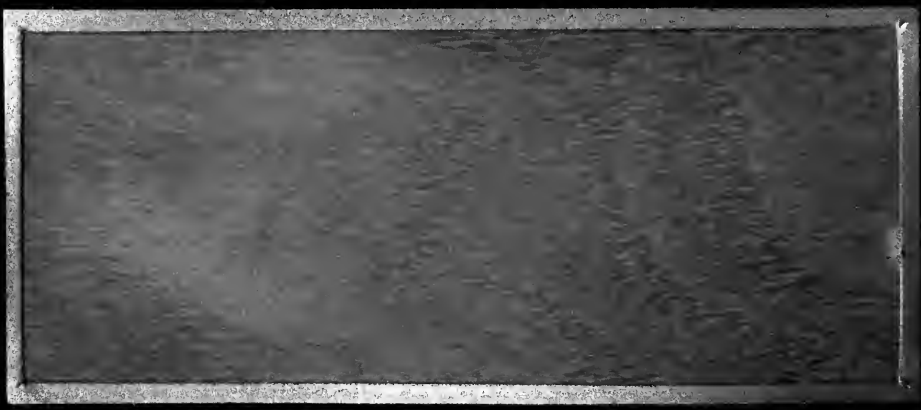
113. PERSEA CAROLINENSIS, NEES. VAR. PAL,CH.

Swamp Red Bay.

TRANSVERSE SECTION.



RADIAL SECTION.



TANGENTIAL SECTION

Ger. Rother Lorberbaum. *Fr.* Persea de Caroline

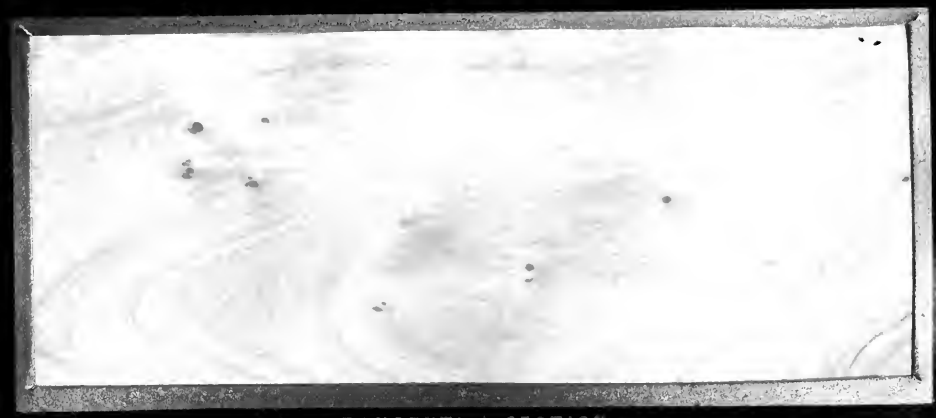
Sp. Laurel colorado.

114. PLANERA AQUATICA. GMEL.

Planer Tree.

TRANSVERSE SECTION.

RADIAL SECTION.



TANGENTIAL SECTION

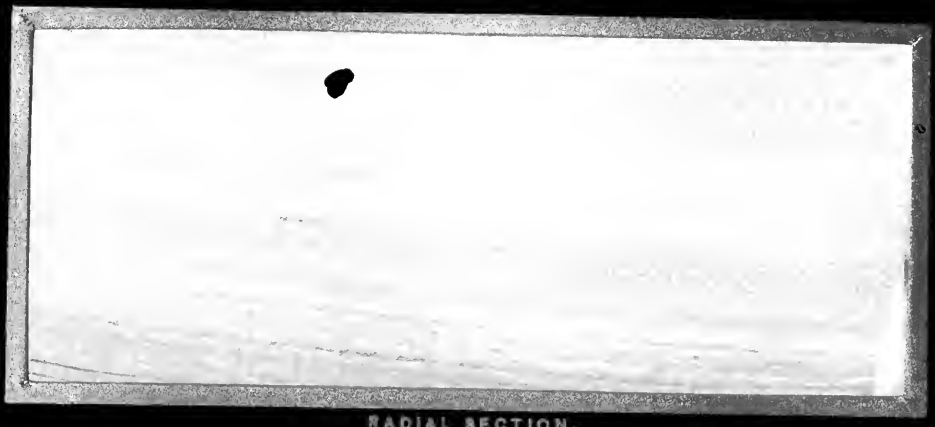
Ger. Ulmenblättrige Planera. Fr. Planera aquatique.

Sp. Planera aquatica.

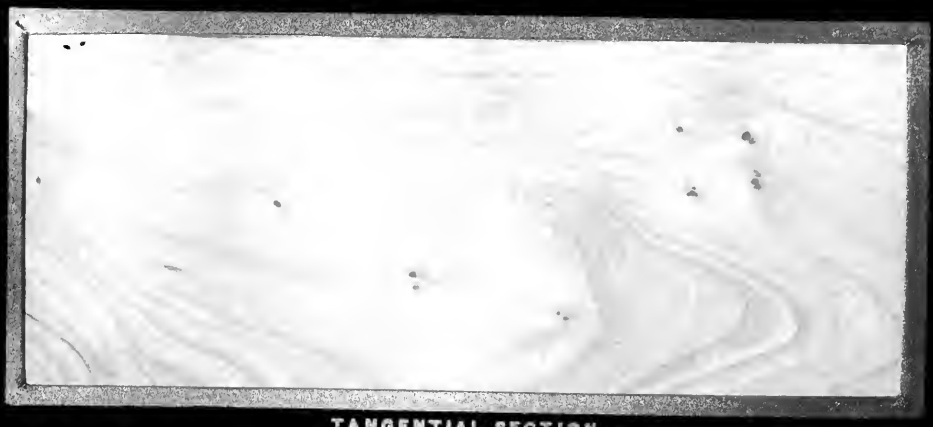
114. PLANERA AQUATICA. GMEL.

Planer Tree.

TRANSVERSE SECTION.



RADIAL SECTION.



TANGENTIAL SECTION

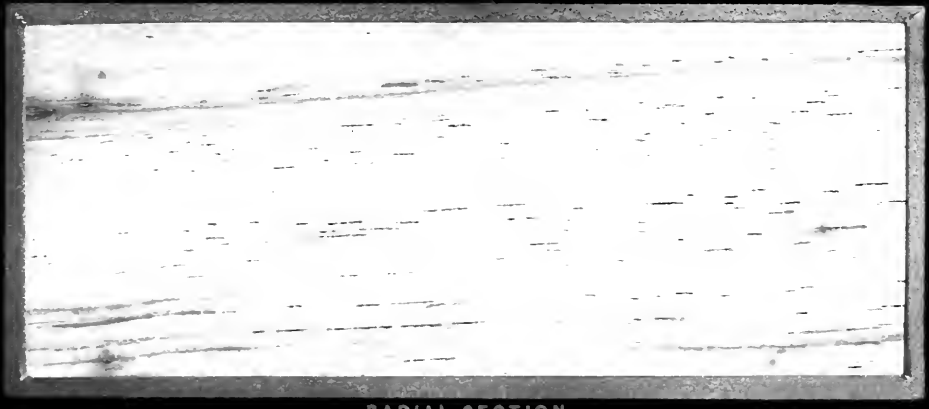
Ger. Ulmenblättrige Planera. *Fr.* Planera aquatique.

Sp. Planera acuatica.

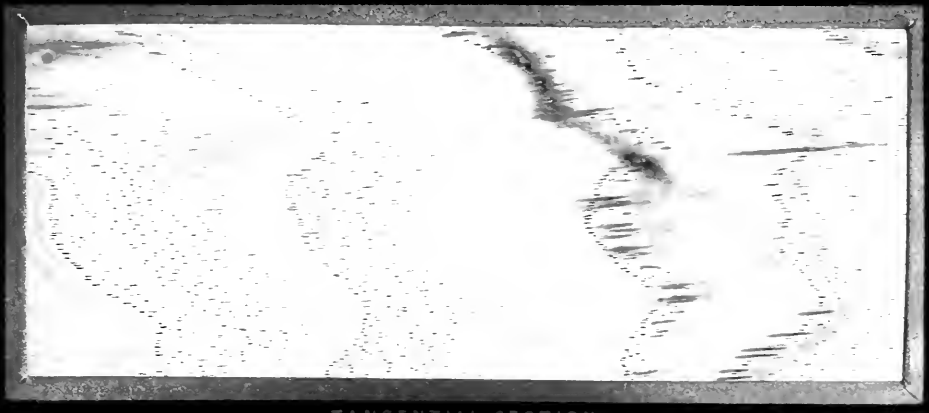
115. CARYA AQUATICA, NUTT.

Water Hickory, Swamp Hickory, Bitter Pecan.

TRANSVERSE SECTION.



RADIAL SECTION.



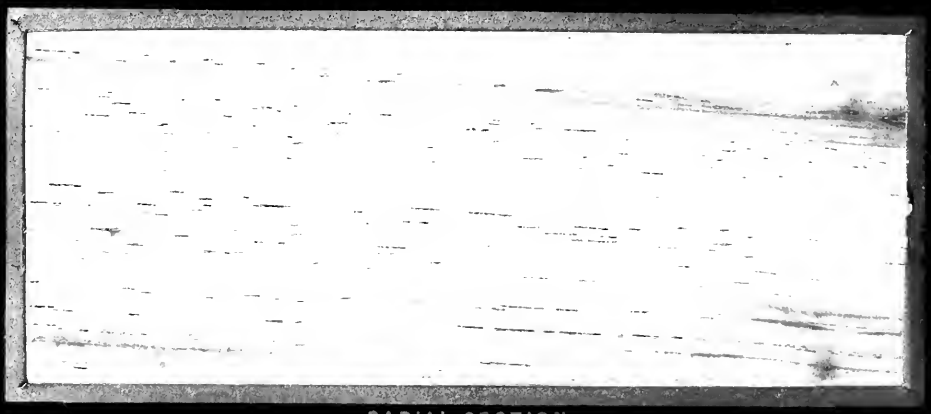
TANGENTIAL SECTION

Ger. Sumpf-Hickory. Fr. Noyer aquatique. Sp. Nogal acuatico.

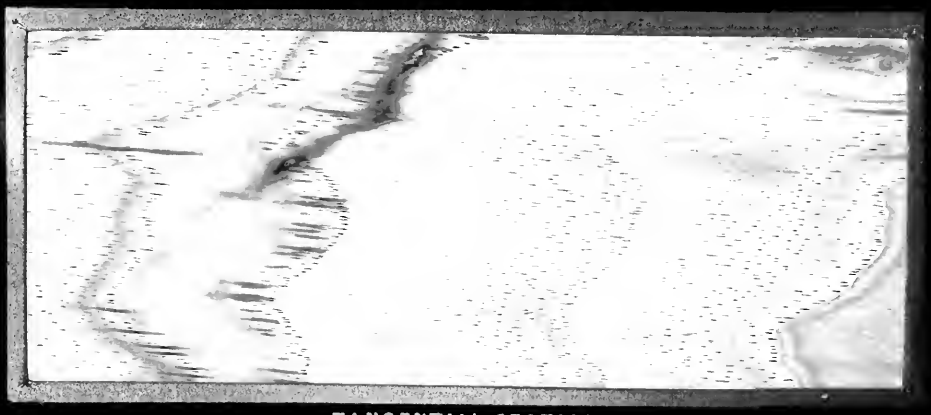
115. CARYA AQUATICA, NUTT.

Water Hickory, Swamp Hickory, Bitter Pecan.

TRANSVERSE SECTION.



RADIAL SECTION.

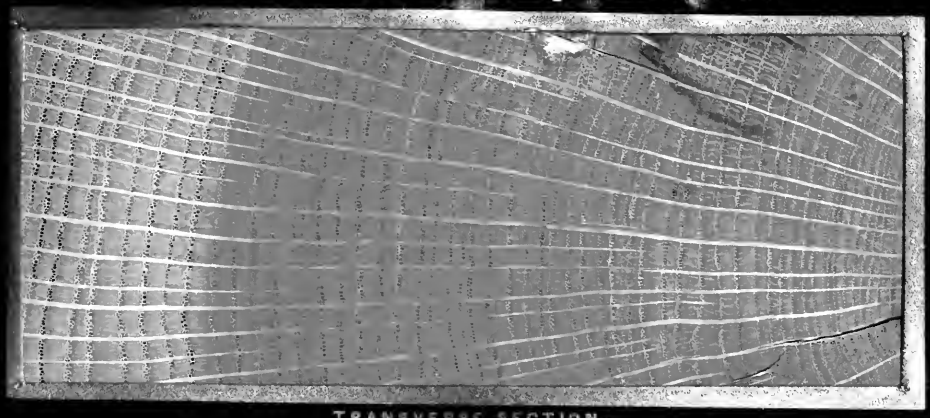


TANGENTIAL SECTION

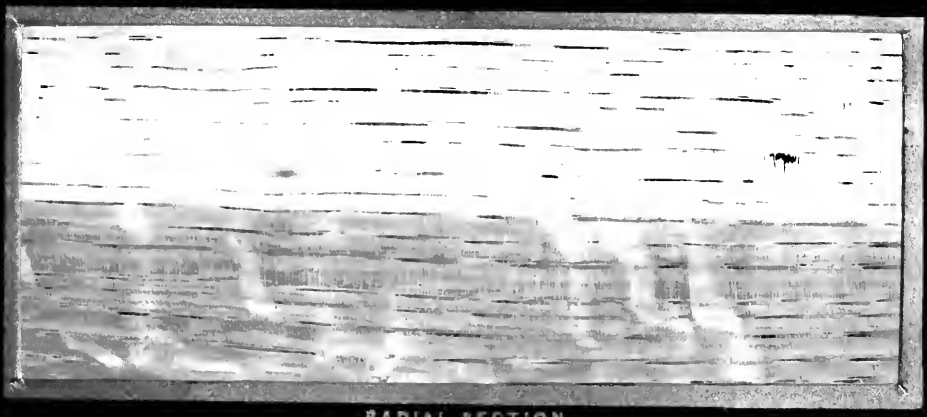
Ger. Sumpf-Hickory. Fr. Noyer aquatique. Sp. Nogal

116. QUERCUS MICHAUXII, NUTT.

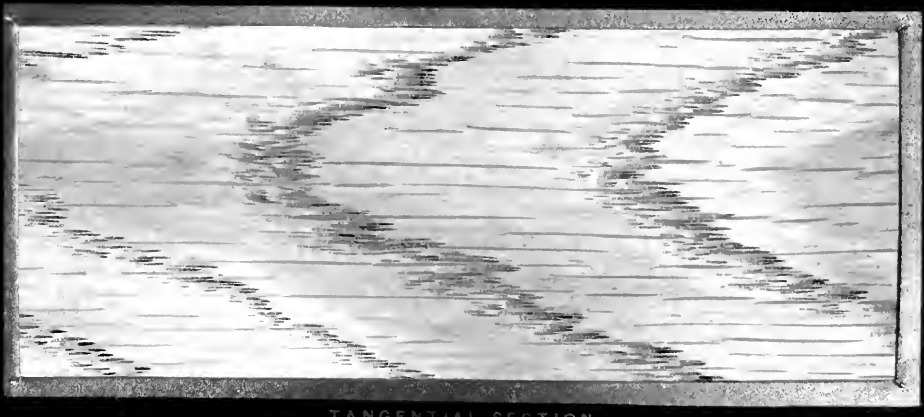
Basket Oak, Cow Oak, Swamp Chestnut Oak



TRANSVERSE SECTION.



RADIAL SECTION.

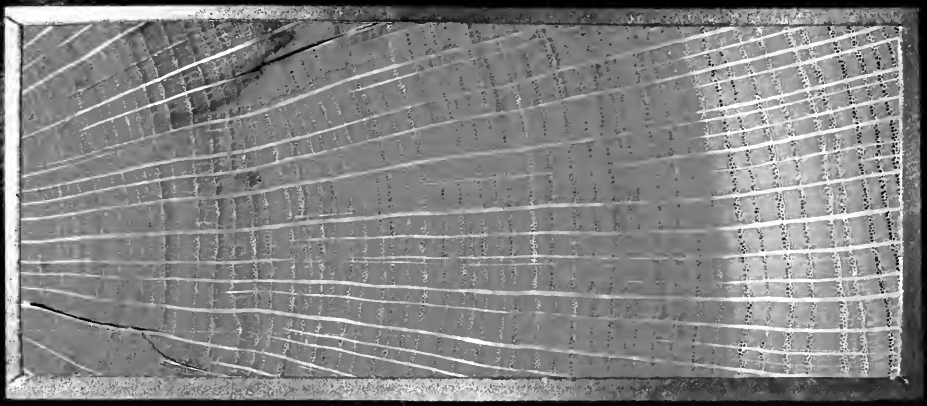


TANGENTIAL SECTION

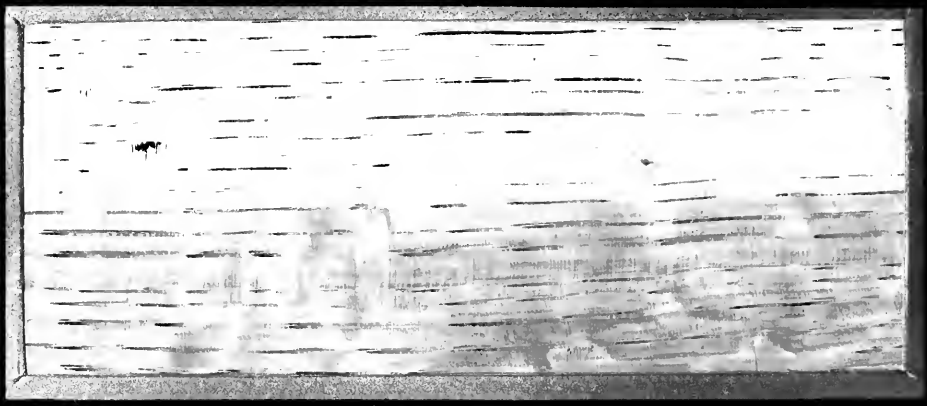
Ger. Korb-Eiche. Fr. Chêne de panier. Sp. Roble de canasto.

116. QUERCUS MICHAUXII, NUTT.

Basket Oak, Cow Oak, Swamp Chestnut Oak



TRANSVERSE SECTION.



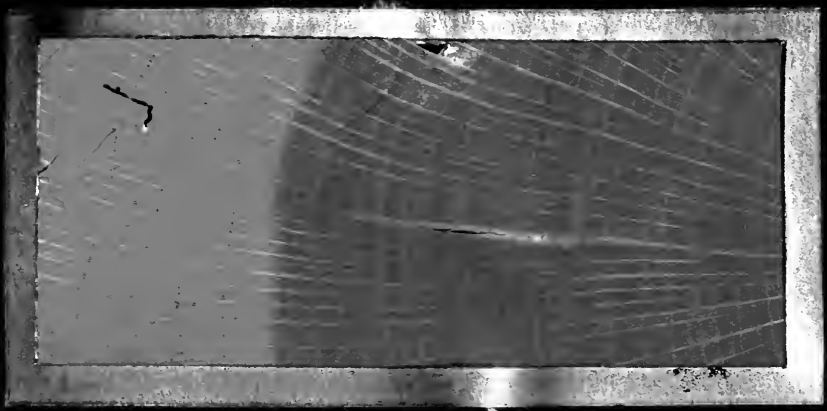
RADIAL SECTION.

TANGENTIAL SECTION

Ger. Korb-Eiche. Fr. Chêne de panier. Sp. Roble de canasta

117. QUERCUS VIRENS Ait.

LIVE OAK.



TRANSVERSE SECTION.

RADIAL SECTION.

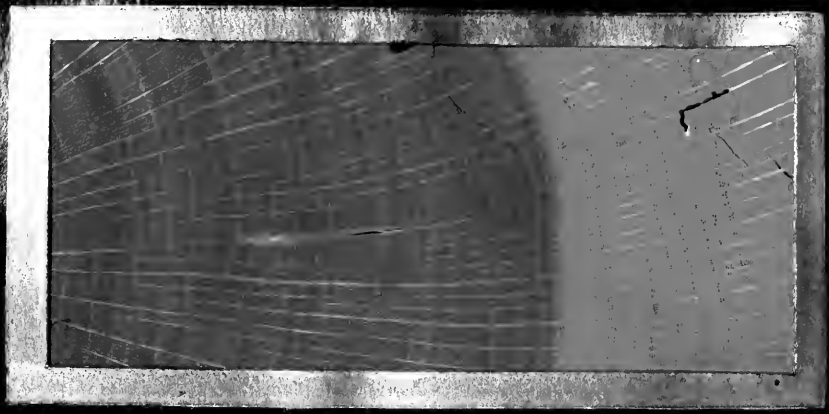
TANGENTIAL SECTION.

...er. Immergrüne Eiche. Fr. Chêne vert.

Sp. Roble siempre verde.

117. QUERCUS VIRENS Ait.

LIVE OAK.



TRANSVERSE SECTION.

RADIAL SECTION.

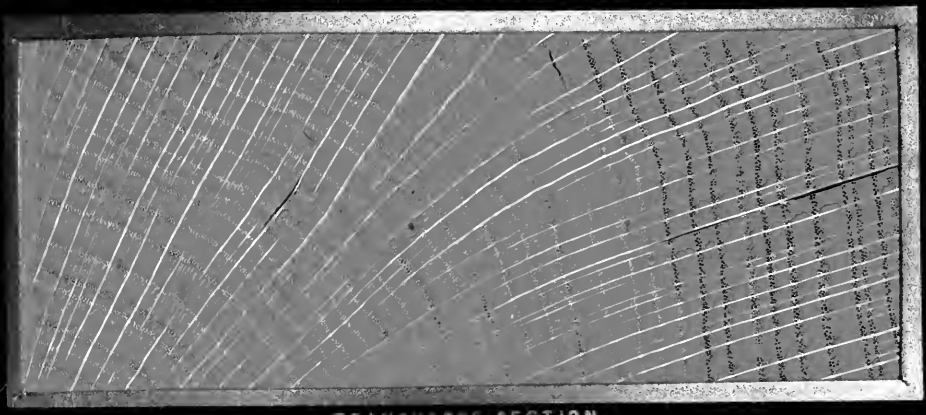
TANGENTIAL SECTION.

Ger. Immergrüne Eiche. Fr. Chêne vert

Sp. Roble siempre verde

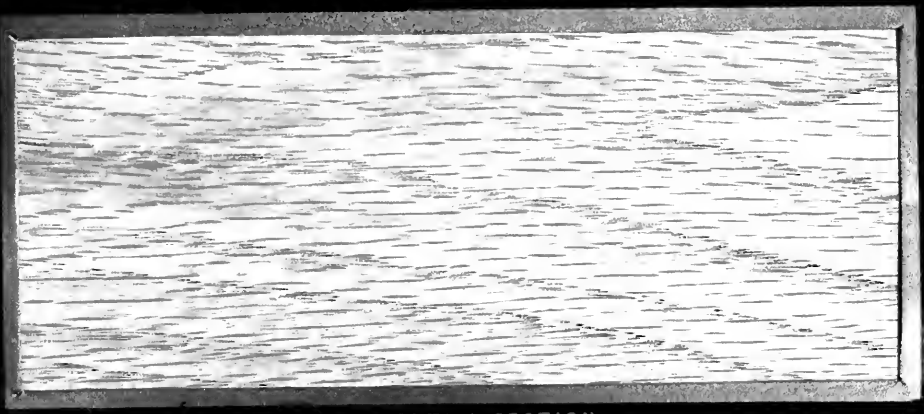
118. QUERCUS AQUATICA, WALT.

Water Oak, Duck Oak, Possum Oak, Punk Oak.



TRANSVERSE SECTION.

RADIAL SECTION.

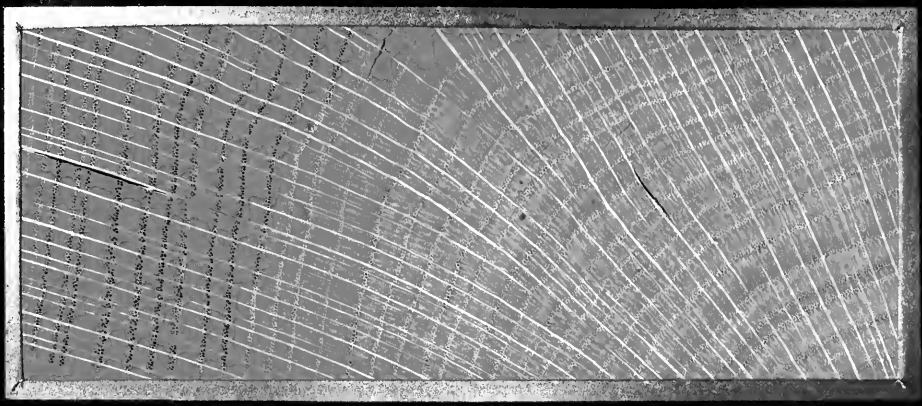


TANGENTIAL SECTION

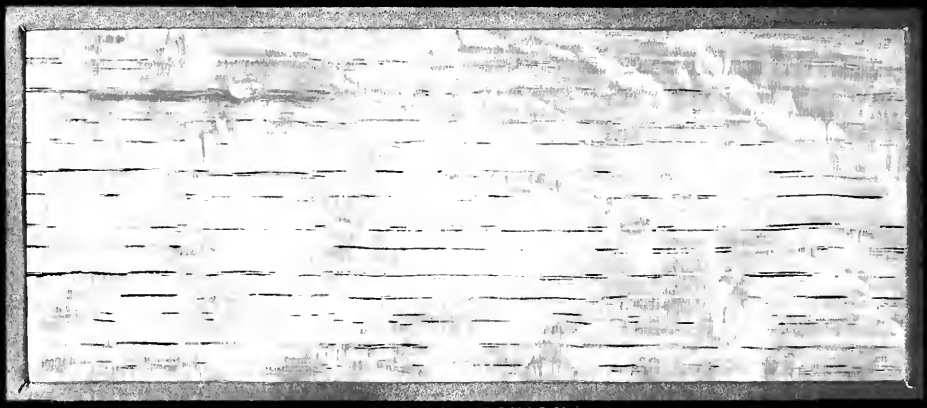
Ger. Wasser-Eiche. Fr. Chêne aquatique. Sp. Roble acuatico.

118. QUERCUS AQUATICA, WALT.

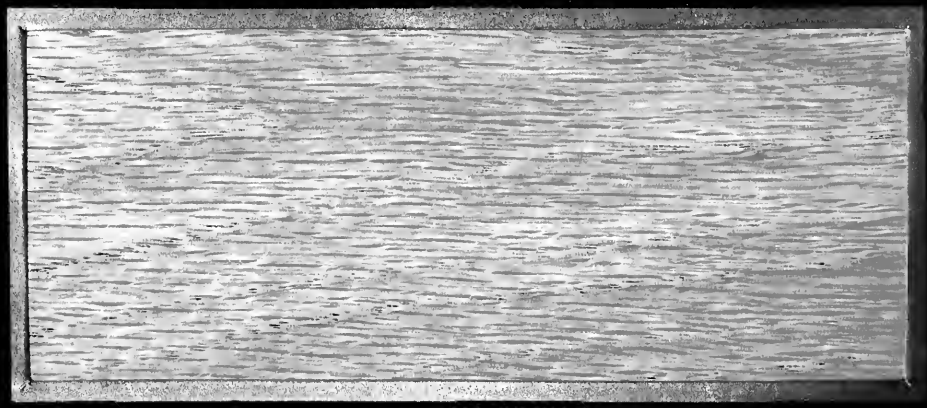
Water Oak, Duck Oak, Possum Oak, Punk Oak.



TRANSVERSE SECTION.



RADIAL SECTION.

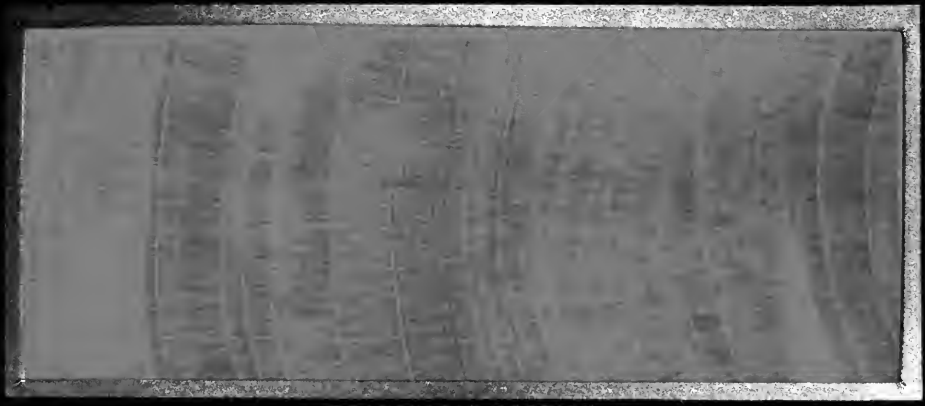


TANGENTIAL SECTION

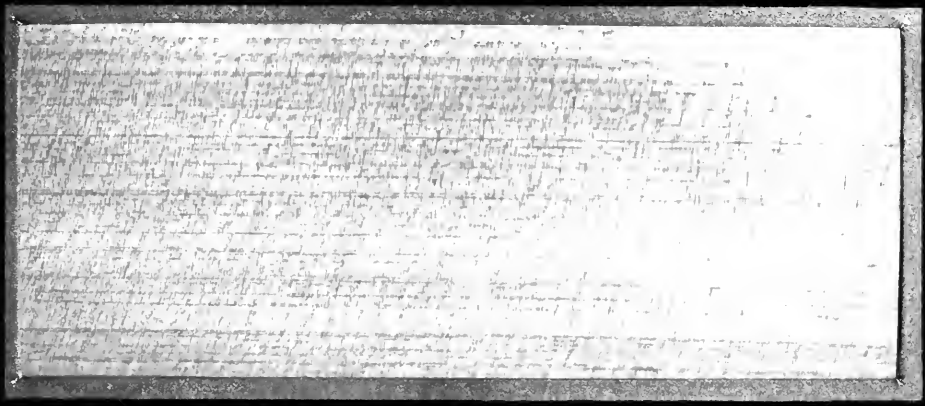
Ger. Wasser-Eiche. Fr. Chêne aquatique. Sp. Roble

119. TAXODIUM DISTICHUM, RICH.

Bald Cypress, Black Cypress, Red Cypress, White Cypress.



TRANSVERSE SECTION.



RADIAL SECTION.

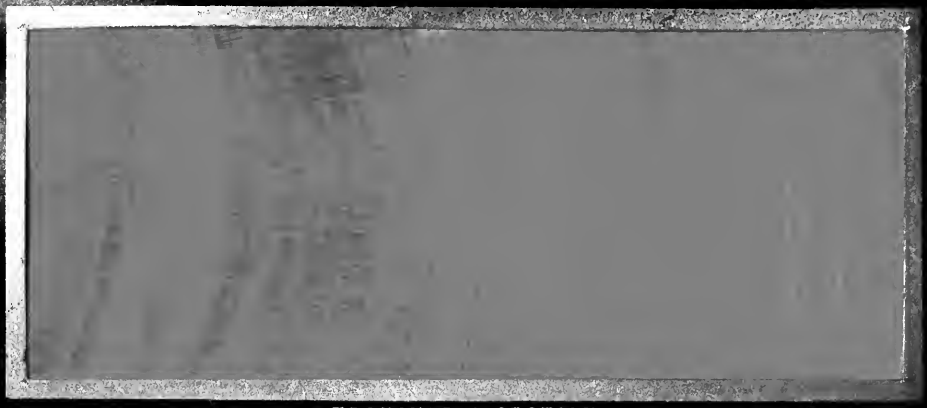
TANGENTIAL SECTION

Ger. Zweizeliche Eibencypresse. Fr. Cypres afeuille.

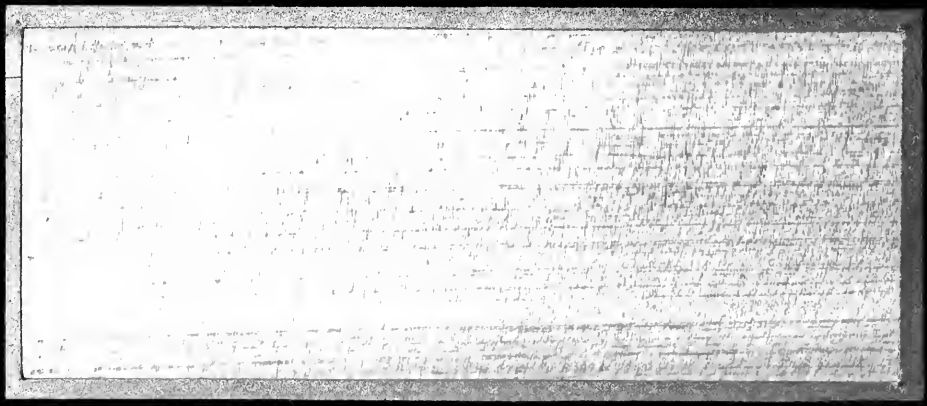
Sp. Cipres deshojado.

119. TAXODIUM DISTICHUM, RICH.

Bald Cypress, Black Cypress, Red Cypress, White Cypress.



TRANSVERSE SECTION.



RADIAL SECTION.

TANGENTIAL SECTION

Ger. Zweizeliche Eibencypresse. Fr. Cypres afeuille.

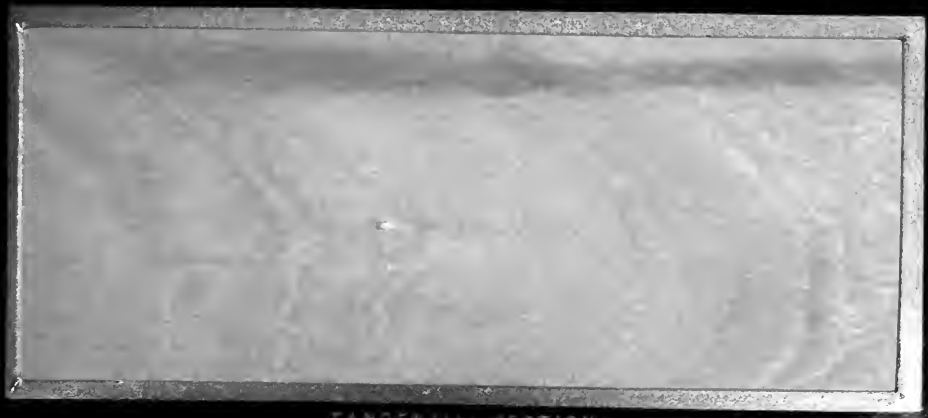
Sp. Cipres deshojado.

120. - TORREYA TAXIFOLIA, ARN.

Yew-leaved Torreya, Stinking Cedar, Savin.

TRANSVERSE SECTION.

RADIAL SECTION.

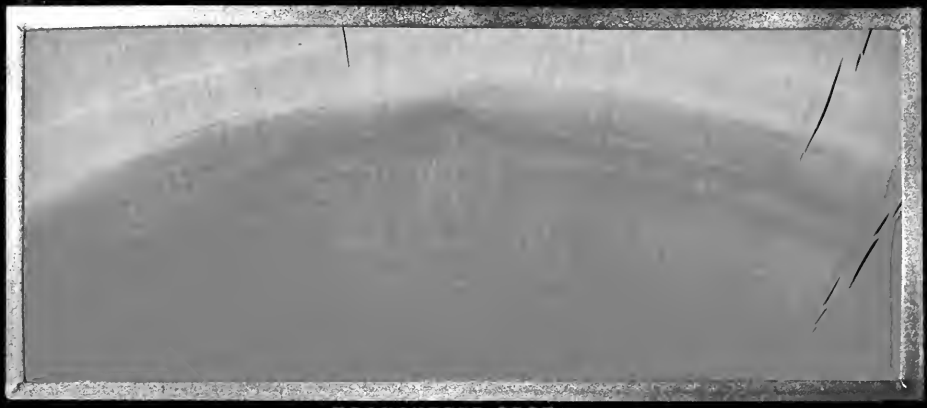


TANGENTIAL SECTION

Ger. Stink-Ceder. Fr. Torreya à feuilles d'If. Sp. Cedro fetido.

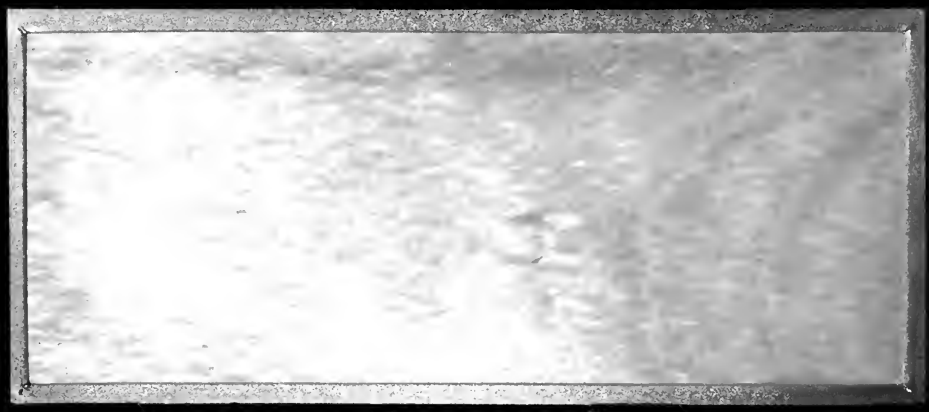
120. TORREYA TAXIFOLIA, ARN.

Yew-leaved Torreya, Stinking Cedar, Savin.



TRANSVERSE SECTION.

RADIAL SECTION.

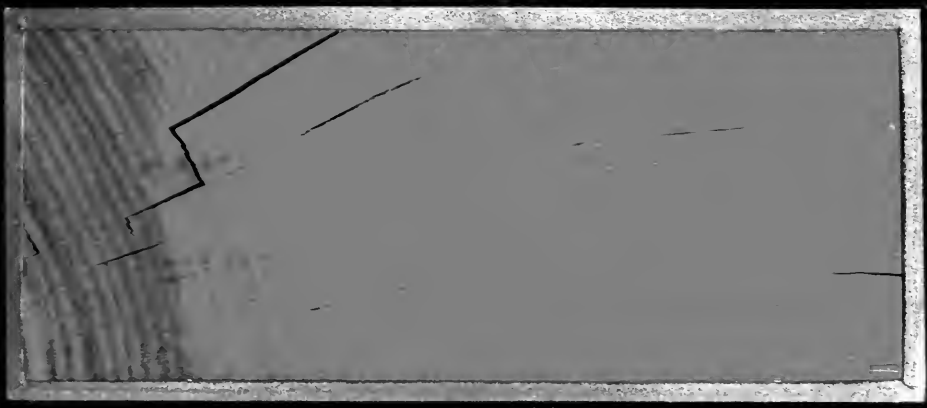


TANGENTIAL SECTION

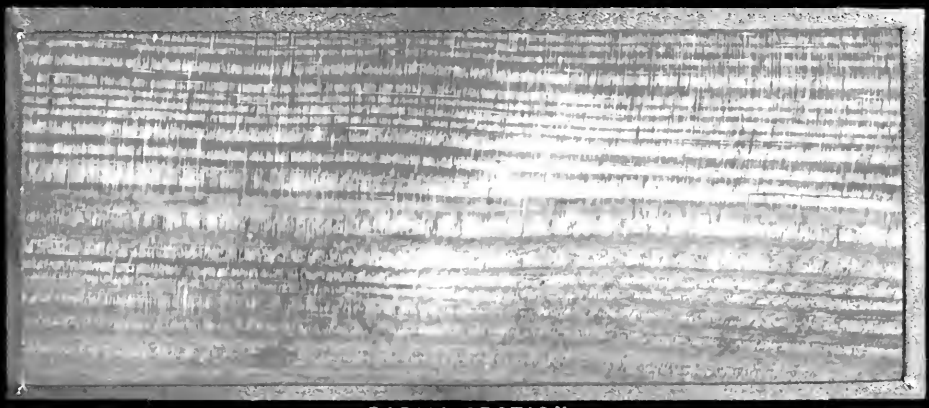
Ger. Stink-Ceder. Fr. Torreya à feuilles d'If. Sp. Cedro [illegible]

121. PINUS SEROTINA, MICHX.

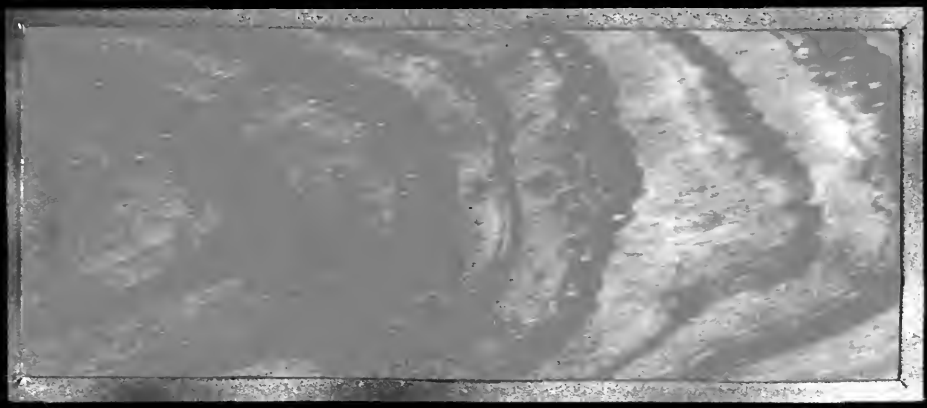
Pond Pine.



TRANSVERSE SECTION.



RADIAL SECTION.

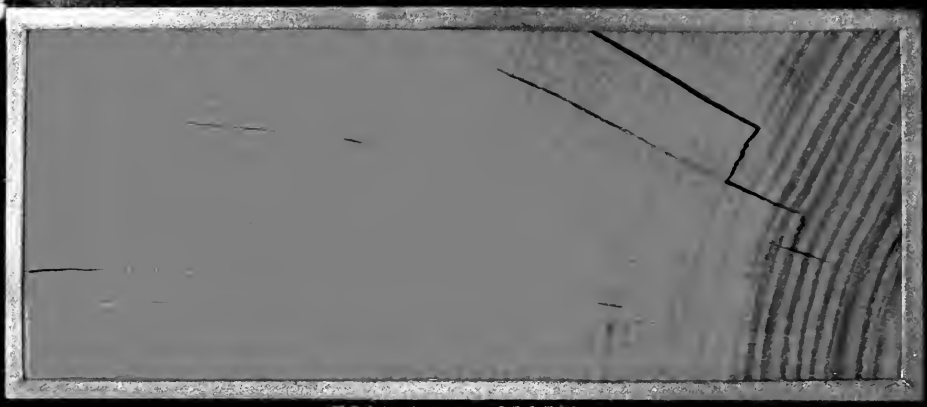


TANGENTIAL SECTION

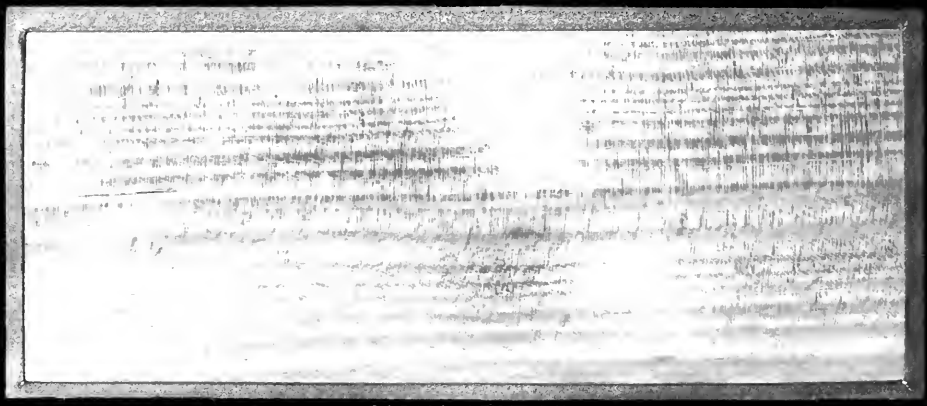
Ger. Teich-Fichte. Fr. Pin d'Etang. Sp. Pino pantanoso.

121. PINUS SEROTINA, MICHX.

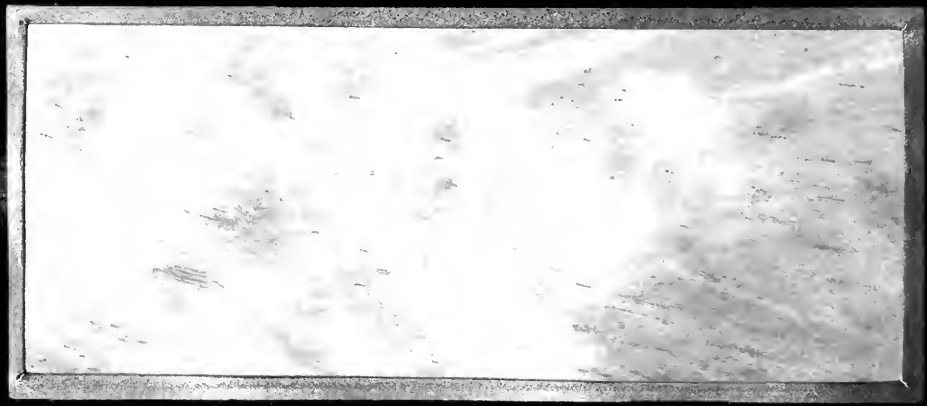
Pond Pine.



TRANSVERSE SECTION.



RADIAL SECTION.

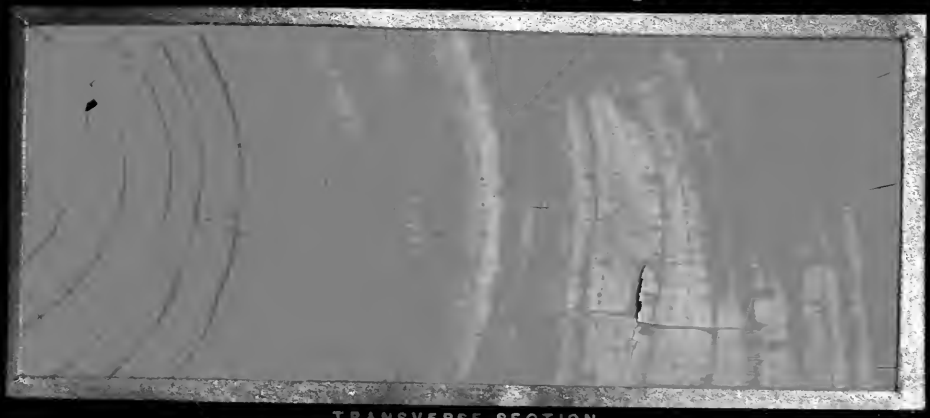


TANGENTIAL SECTION

Ger. Teich-Fichte. *Fr.* Pin d'Etang. *Sp.* Pino pantanoso.

122. PINUS CLAUSA, VASEY.

Sand Pine, Scrub Pine, Upland Spruce Pine.



TRANSVERSE SECTION.

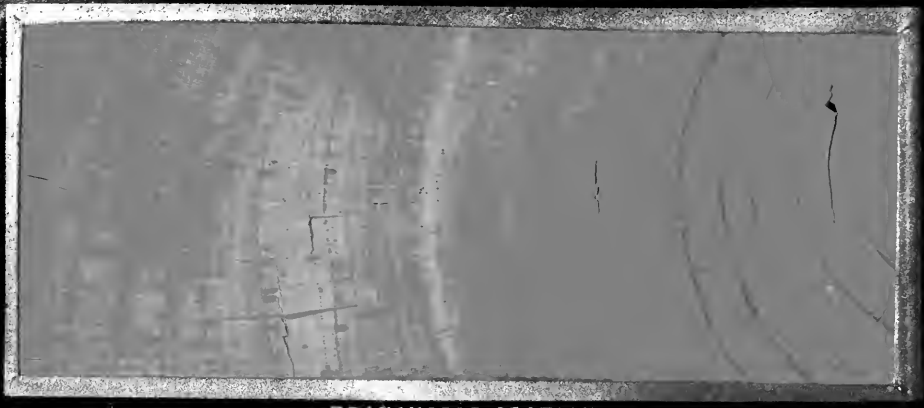
RADIAL SECTION.

TANGENTIAL SECTION

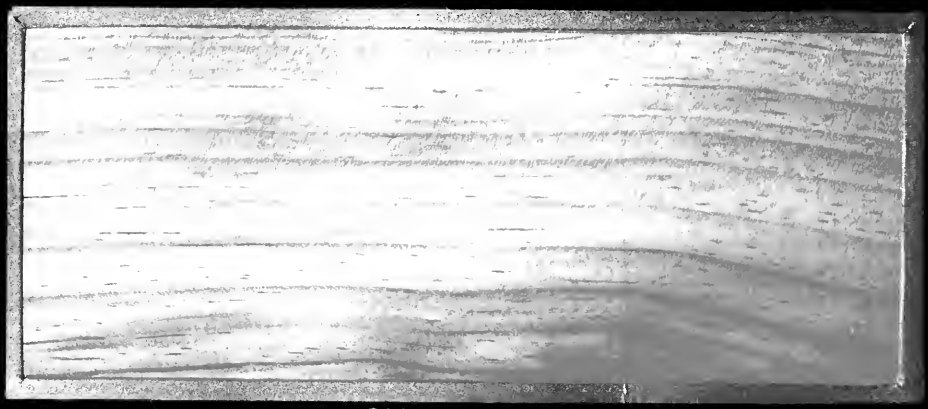
Ger. Sand-Fichte Fr. Pin sablonneaux. Sp. Pino de arena.

122. PINUS CLAUSA, VASEY.

Sand Pine, Scrub Pine, Upland Spruce Pine.



TRANSVERSE SECTION.



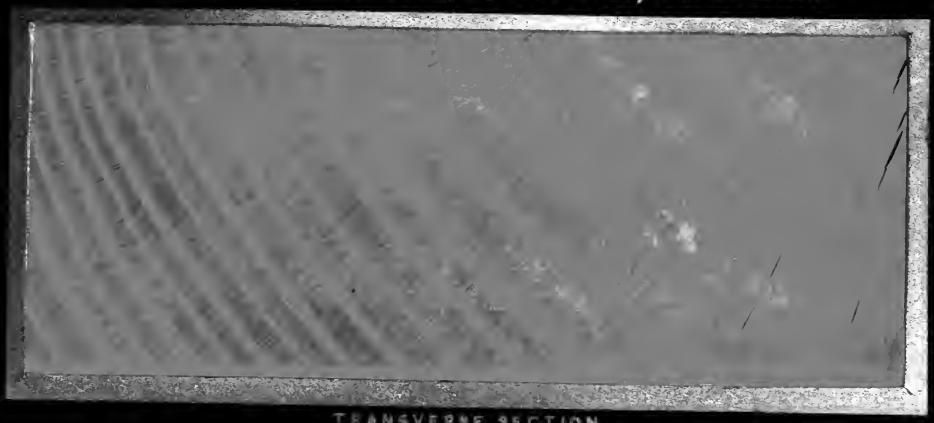
RADIAL SECTION.

TANGENTIAL SECTION

Ger. Sand-Fichte. *Fr.* Pin sablonneaux. Sp. Pino de arena.

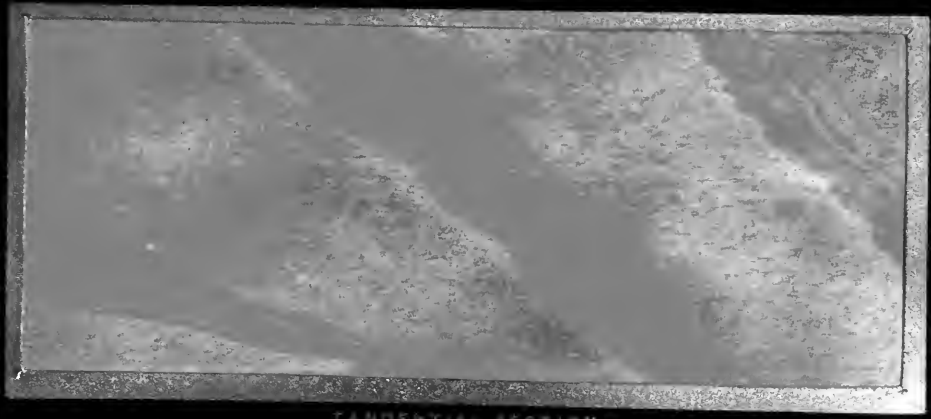
123. PINUS GLABRA, WALT.

Lowland Spruce Pine, White Pine, Cedar Pine.



TRANSVERSE SECTION.

RADIAL SECTION.

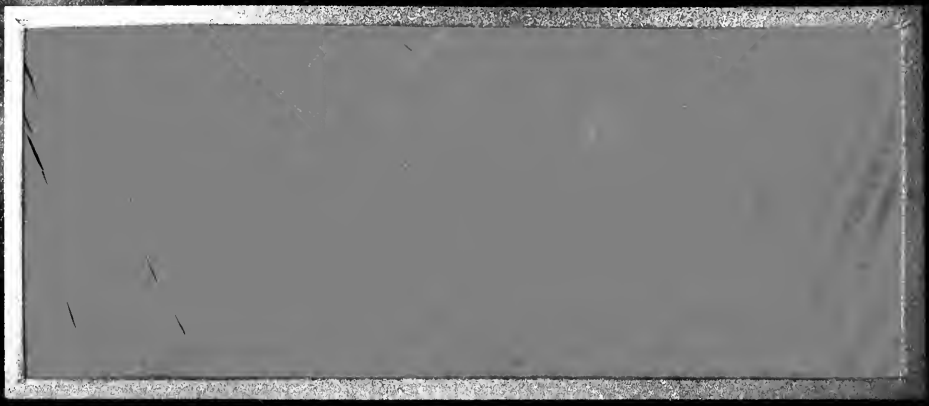


TANGENTIAL SECTION

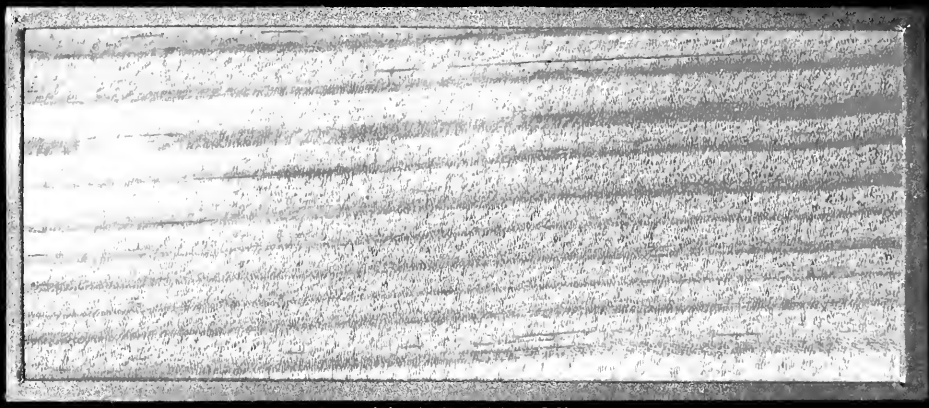
Ger. Glatte-Fichte. Fr. Pin de Cedre. Sp. Pino liso.

123. PINUS GLABRA, WALT.

Lowland Spruce Pine, White Pine, Cedar Pine.



TRANSVERSE SECTION.



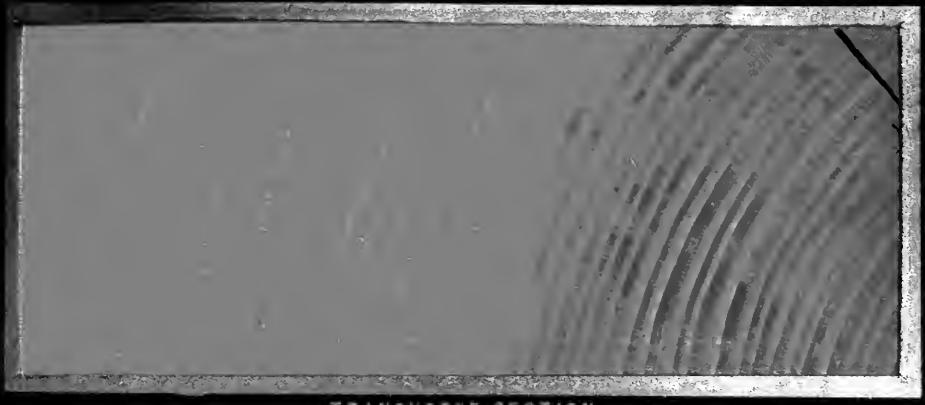
RADIAL SECTION.

TANGENTIAL SECTION

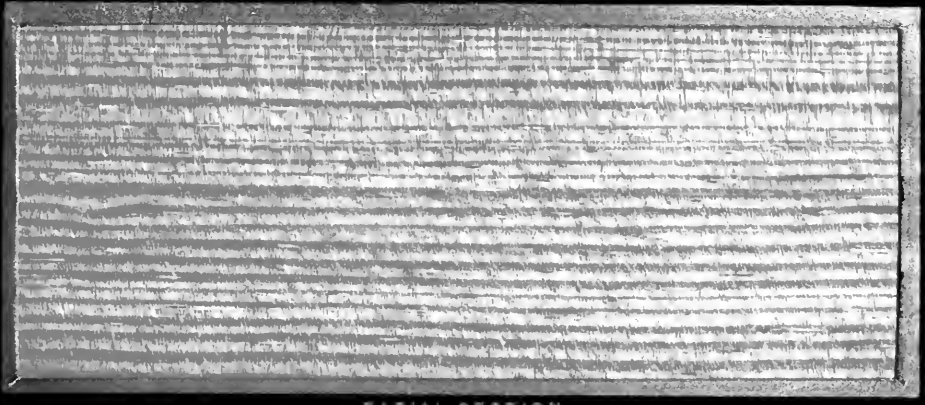
Ger. Glatte-Fichte. Fr. Pin de Cedre. Sp. Pino Blanco

124. PINUS PALUSTRIS, MILL.

Long-leaved Pine, Hard Pine, Georgia Pine, Southern Pine.



TRANSVERSE SECTION.



RADIAL SECTION.

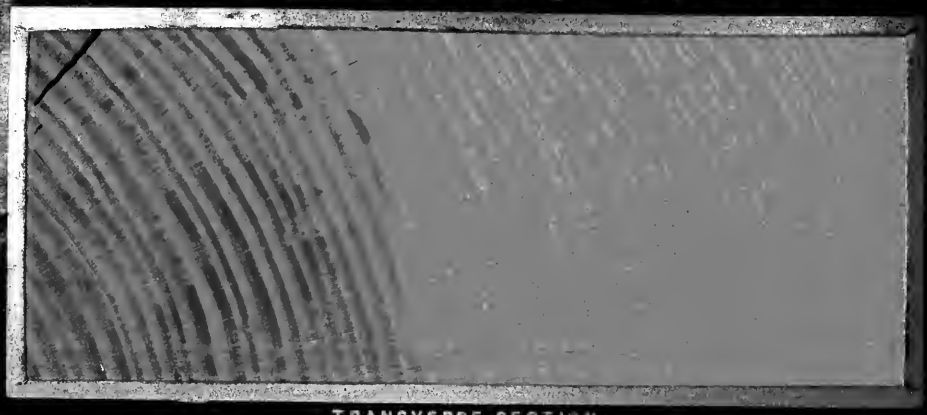
TANGENTIAL SECTION

Ger. Langnadelige Fichte. Fr. Pin de feuilles allonges.

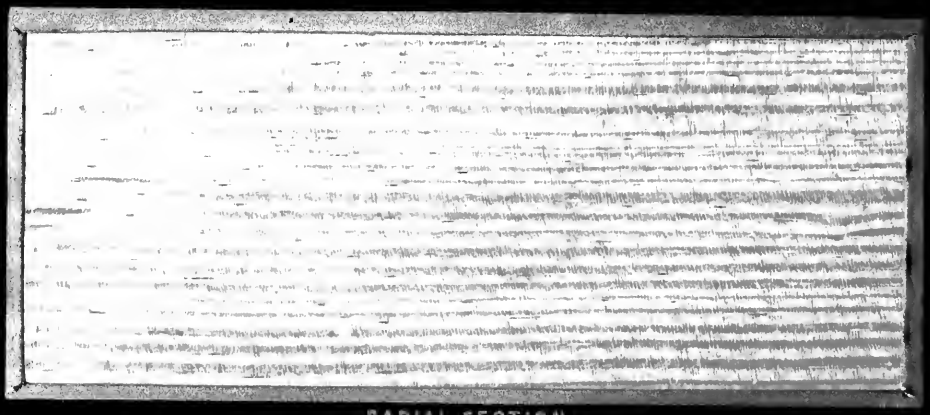
Sp. Pino con hojas largas.

124. PINUS PALUSTRIS, MILL.

Long-leaved Pine, Hard Pine, Georgia Pine, Southern Pine.



TRANSVERSE SECTION.



RADIAL SECTION.

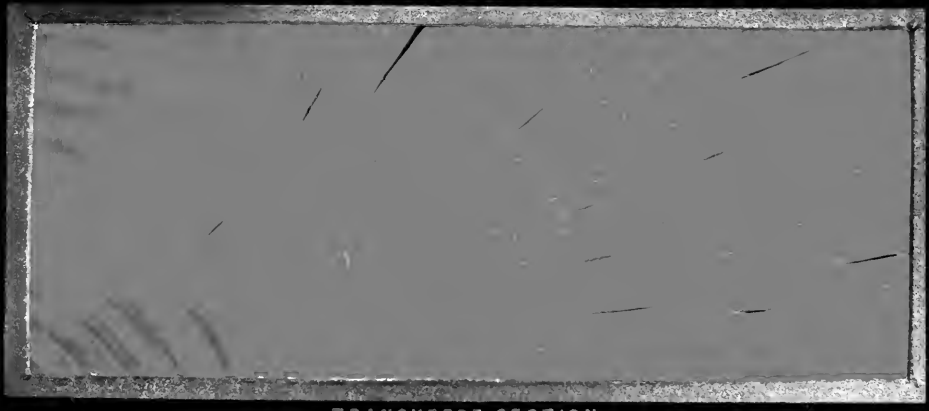
TANGENTIAL SECTION

Ger. Langnadelige Fichte. Fr. Pin de feuilles allongés.

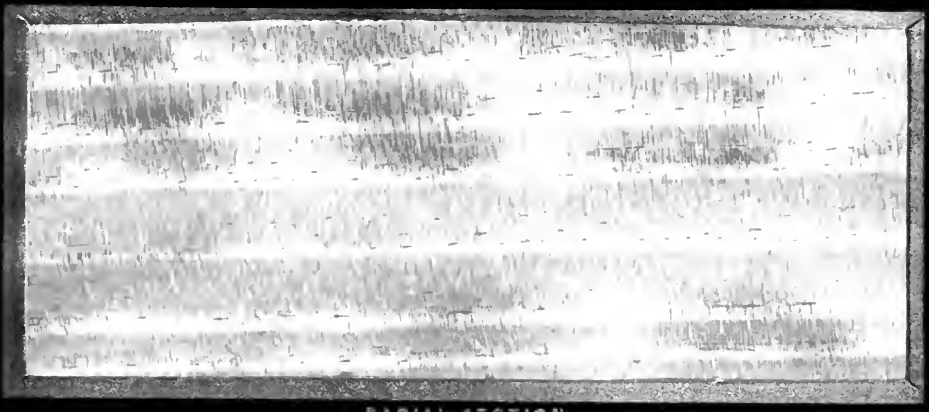
Sp. Pino con hojas largas.

125. PINUS CUBENSIS, GRISEB.

Slash Pine, Swamp Pine, Bastard Pine, Meadow Pine.



TRANSVERSE SECTION.



RADIAL SECTION.

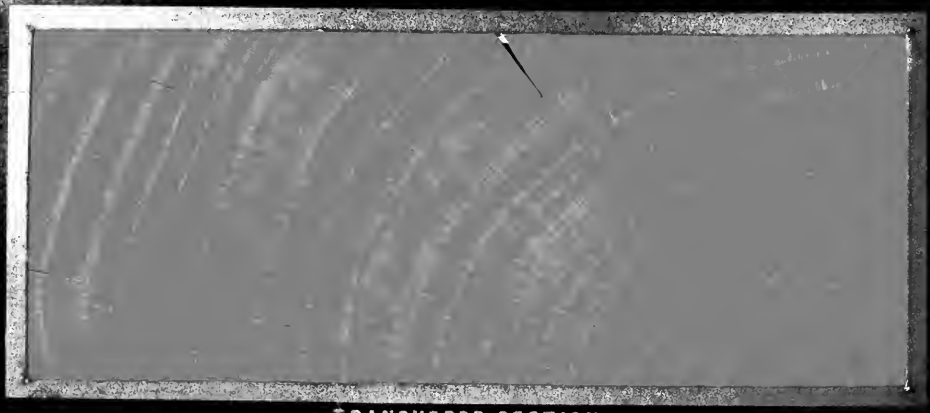
TANGENTIAL SECTION

Ger. Cubanische Fichte. *Fr.* Pin taillade.

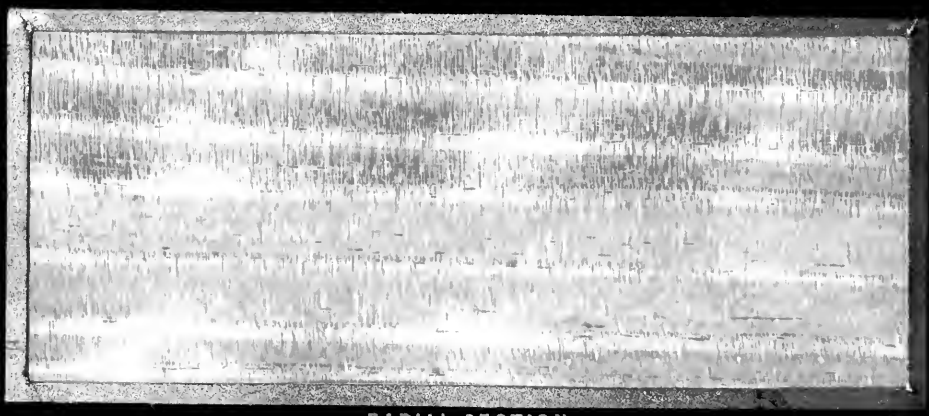
Sp. Pino recortado.

125. PINUS CUBENSIS, GRISEB.

Slash Pine, Swamp Pine, Bastard Pine, Meadow Pine.



TRANSVERSE SECTION.



RADIAL SECTION.

TANGENTIAL SECTION

Ger. Cubanische Fichte. Fr. Pin taillade.

Sp. Pino recortado.